FLOOD PLAIN INFORMATION

DORCHESTER, WHITMAN, QUESET, BLACK, BEAVER, POQUANTICUT, MULBERRY and GOWARDS BROOKS

EASTON, MASSACHUSETTS

PREPARED BY THE DEPARTMENT OF THE ARMY, NEW ENGLAND DIVISION, CORPS OF ENGINEERS, WALTHAM, MASSACHUSETTS

APRIL 1977

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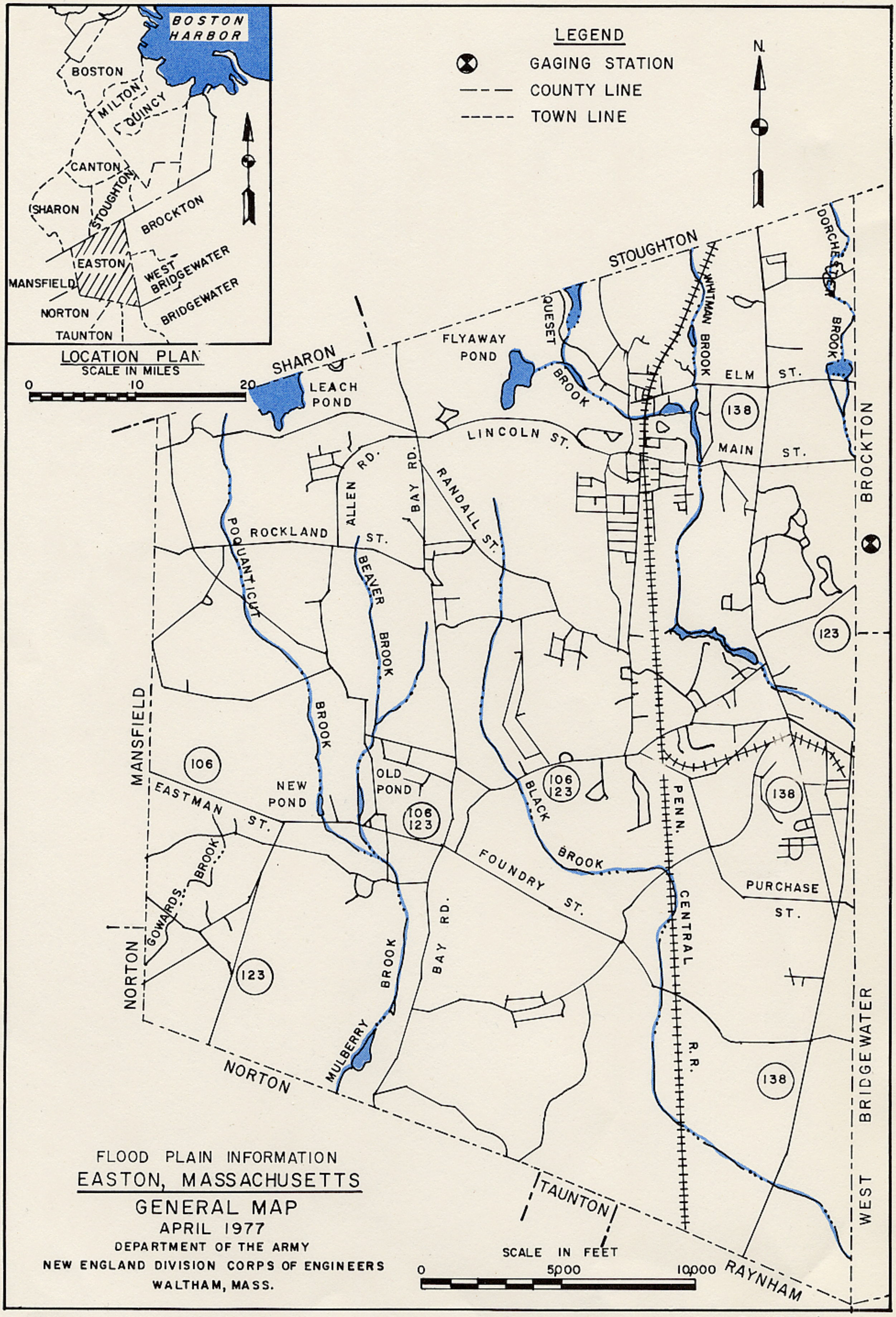

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EASTON, MASSACHUSETTS

GENERAL MAP

APRIL 1977

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION CORPS OF ENGINEERS

WALTHAM, MASS.

PLATE I

PREFACE

Demands for the use of flood plains continue to grow in southeastern Massachusetts as the pressures caused by the ever-increasing circle of urbanization around the core city of Boston become more apparent. This growth is showing itself in the development of the Town of Easton where nearby highway networks and the proximity of commuter rail service are making this town a focal point for potential large scale residential and commercial land development. Easton has already experienced zoning, established in 1973, has been and shall continue to be useful in curtailing the development of one of Easton's valuable natural resources.

This report has been prepared to make available basic technical information about flood plain hazards in Easton and to serve as a sound basis for land use planning and management decisions concerning flood plain utilization. The purpose of this report is to provide information which will aid state and local planners and officials in future use of flood plain areas. The report does not include recommendations for the solution of any present or future flood problems. It does include a history of flooding on the eight brooks analyzed and identifies those areas that are subject to possible future floods. Emphasis in the report is given to these floods through maps, photographs, and profiles.

This report was prepared by Schoenfeld Associates, Inc., Boston, Massachusetts, for the New England Division of the Corps of Engineers under continuing authority provided in Section 206 of the 1960 Flood Control Act, as amended.

The assistance and cooperation given by the U. S. Geological Survey, Soil Conservation Service, the Massachusetts Department of Public Works, the Town of Easton, and private citizens in providing useful data and photographs for the preparation of this report are appreciated.

Additional copies of this report can be obtained from the administrative offices of the Town of Easton. The New England Division of the Corps of Engineers, upon request, will provide technical assistance to planning, guidance, and further assistance, including the development of additional technical information.

BACKGROUND INFORMATION

Settlement

The Town of Easton is located in the northeast corner of Bristol County, Massachusetts, approximately 24 miles south of Boston and 3 miles west of Brockton.

The area was settled in 1668 when Thomas Willet purchased it for the Plymouth Colony from Massasoit, Chief of the Wampanoags. Later in the year, 53 men formed the Taunton North Purchase Company, which purchased 50 square miles of the original area for $100.00. The land was then divided by the members of the Company.

In 1710, the Taunton North Purchase Company's land became known as Norton. The families at the east end of the town requested of the Massachusetts Legislature that the east end be made a separate town because of the inconvenience in traveling to town meetings. The Legislature accepted the petition: the Town of Easton was incorporated on December 21, 1725.

The 19th century brought industrial development to Easton. In North Easton, Oliver Ames constructed a shovel factory near Shovelshop Pond. In South Easton, Daniel Belcher started a thread factory. The presence of the new industries resulted in an increase in population from 1,756 in 1830 to 3,948 in 1885.

In the 20th century, the industrial accomplishments changed significantly. The reliance of the town on the now defunct Ames Shovel Factory has been superseded by a reliance upon smaller, more diversified factories and commercial establishments. This is shown by the increase in population from 9,078 in 1960 to 12,157 in 1970.

The Streams and Their Valleys

Easton comprises an area of approximately 29 square miles or 18,560 acres. Its topography is generally quite level with a rocky and swampy surface. There are many brooks and streams and large areas of wetlands and swamps. The most important of the swamps is the Hockomock Swamp, a portion of which is to be found in the southeast corner of the town. The entire swamp encompasses portions of six towns and contains approximately 6,000 acres, including the water surfaces of Lake Nippenicket, Lake Sabbatia, and Winnecunnet Pond.

Despite the many streams, brooks, and swamps, there are very few natural ponds within the town. Most of the ponds are man-made, originally being constructed to provide water power for mills and factories.

Easton's underdeveloped or sparsely developed land now consists mostly of woods, plains, and meadows. Much of this undeveloped land should be considered wetlands. Its development would affect the runoff from storms since the large storage capacity which exists in the town would be markedly reduced.

A new state park called Borderland State Park occupies the northwest corner of the town.

The eight brooks analyzed in this report are Beaver, Black, Dorchester, Mulberry, Poquanticut, Queset, Whitman, and Gowards Brooks. Only one has its drainage area totally within the town limits. Table 1 lists the brooks and their respective drainage areas by towns.

Each brook was studied on its own, starting from its headwaters and continuing downstream until the brook had either passed the corporate limits of the town or had merged with another brook. Many of the brooks have their sources in the towns of Stoughton or Sharon and some investigation and hydraulic computations had to be done outside of Easton in order to determine the quantity of water contributed to these brooks from the abutting towns.

All of the eight brooks covered in this report flow generally in a southerly direction. Several of the brooks have an effect on one or more other brooks within the town, i.e., in time of flood, the flood crest is high enough to overflow the banks and, due to the terrain, flood waters will travel overland to an adjacent brook. In other cases, one brook converges with a second brook somewhere within the town. In the latter case, retention is provided by the swamps and ponds, and, therefore, the relative lag time of each of the two brooks becomes quite important. The peak flow on each of the two brooks must be determined not only in quantity but also in time, based upon the beginning of the storm. The peak quantity

TABLE 1

LIST OF WATERSHEDS BY NAME AND AREA

Brook	Brockton	Easton	Mansfield	Norton	Sharon	Stoughton	Taunton	Total
	Area in Acres							
Beaver		1,435						1,435
Black		6,180		70			120	6,370
Dorchester	1,180	670				1,125		2,975
Gowards		1,155	190					1,345
Mulberry		1,790		670				2,460
Poquanticut		2,050	90		1,240	165		3,545
Queset	20	2,875			610	1,370		4,875
Whitman		780				1,200		1,980
	1,200	16,935	280	740	1,850	3,860	120	24,985

of water contributed by each brook may, therefore, not be added directly to give the flow at various points downstream.

Calculations of the quantity of water passing various known points on the brook at any time during the storm were calculated and plotted for each of the eight brooks in the town. A flood hydrograph was then developed which provided the basis for the quantities of water used to determine the flood profiles for storms having the various return frequencies studied. The hydrograph for the March, 1968, flood, measured at Dorchester Brook, is shown in Plate 2 as an example.

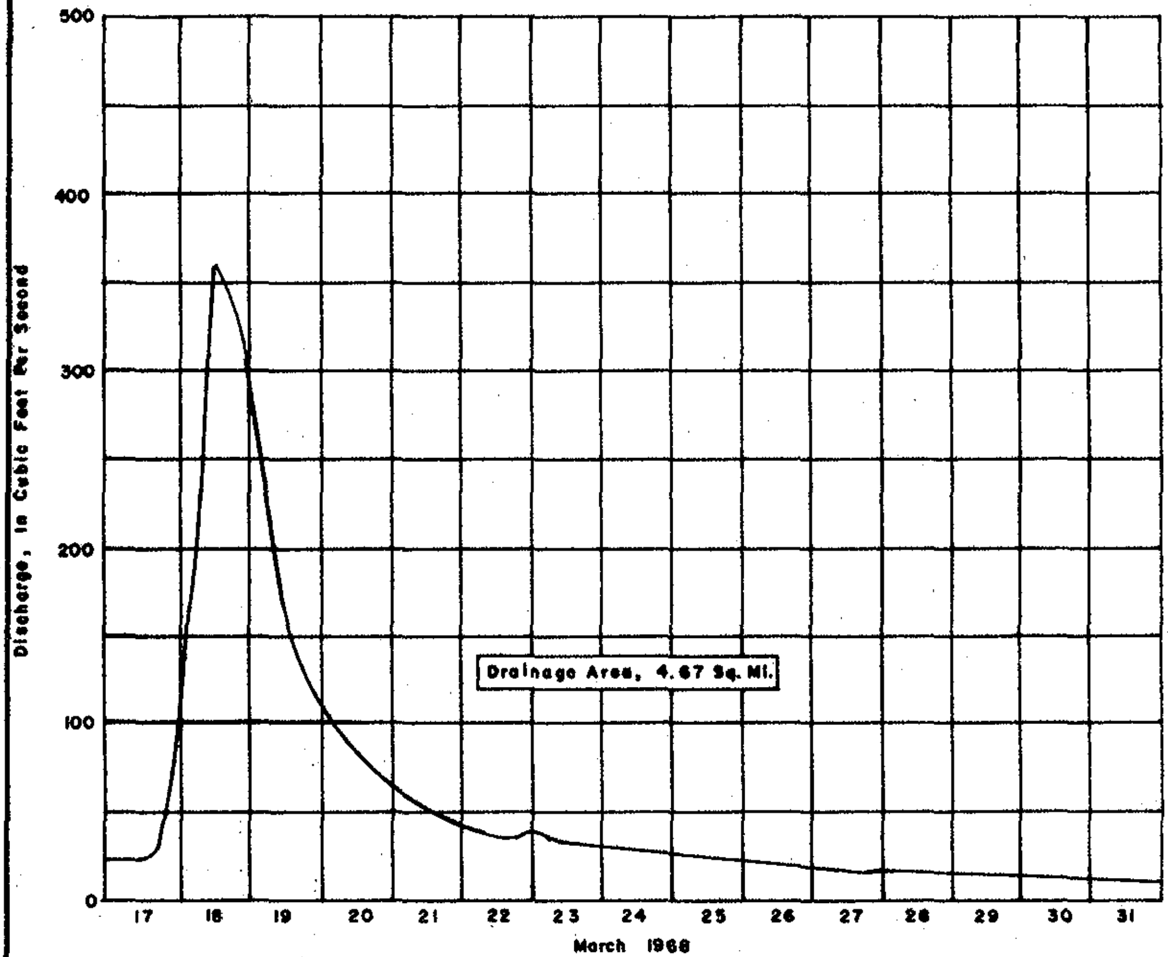
The unusually high percentage of swamps and ponds provides a considerable amount of storage during floods and relatively long retardation of the peak flow on each brook. The retardation and storage that is so prevalent in the town acts to attenuate the effect of the flood flows of the various brooks. Without these natural and man-made storage areas, the effects of flood flows in Easton would have a much greater impact on the town and its economic resources because the flood damage would be markedly greater.

For this report, the brooks within the Town of Easton were analyzed starting from the eastern boundary at Dorchester Brook and working towards the west to Gowards Brook.

The following is a brief description of each of these brooks.

Dorchester Brook

Dorchester Brook, within the Town of Easton, is approximately 10,500 feet long and drops 67 feet in that distance. Most of this drop occurs between French Pond and Monte Pond over a distance of 4,500 feet. In this stretch, the brook drops 50 feet. Dorchester Brook is one of the brooks where the flood crest can overtop the banks to allow flood water to travel overland to an adajcent brook. This condition occurs in the town of Stoughton where flood water from Dorchester Brook can travel across the swamp just above the old railroad embankment to contribute to the flow in Whitman Brook. The flow that does pass south of the old railroad embankment is then stored and retarded behind Atkinson Avenue in Stoughton. These two storage areas reduce the effect of the flood flow entering the Town of Easton. This reduced flood flow entering Easton then must



DISCHARGE HYDROGRAPH
DORCHESTER BROOK
PEARL STREET, BROCKTON GAGING STATION

PLATE 2

pass through a swamp and into French Pond. The natural swamp and the man-made French Pond store a relatively large quantity of water and attenuate flood flow beyond that point.

This happens again as the stream proceeds south. The flow leaving French Pond drops rather sharply and then enters a large swamp of about 100 acres just above Monte Pond. The combination of the natural swamp and the man-made pond stores a relatively large amount of the flood flow again. The same situation happens a third time where flow from Monte Pond first passes through a swampy area and then flows into Bigney Pond. Again, Bigney Pond is a man-made pond, and the combination of a natural swamp and a man-made pond also tends to attenuate the effect of the flood flow and to retard the time of peak flow on Dorchester Brook.

Because of the retarding effects upon the brook, the flood plains are quite large.

After leaving Bigney Pond, Dorchester Brook flows a few thousand feet downstream and passes the gaging station just upstream of Pearl Street in Brockton. At this point, the drainage area of Dorchester Brook is 4.67 square miles. Of this 4.67 square miles, almost 14 percent is either swamp or pond. Another fact of note is that the average slope of the brook is only approximately 0.28 percent, exclusive of the pond areas and the steep drop just below French Pond. The effects of the large storage area and the relatively flat slope of the brook are to make the recorded flows at the gaging station in Brockton relatively low for a brook with that size watershed area above it.

The dam at Monte Pond, just north of Elm Street, was purposely breached in June of 1974. This decision was made because of the questionable structural integrity of the old dam and thus by breaching the dam, possible serious future flood damage due to failure of the dam would be averted.

Whitman Brook

Whitman Brook, from the Easton-Stoughton line to its confluence with Queset Brook at Langwater Pond, is only 7,200 feet long. In this reach, the brook drops 18 feet at an average slope of 0.25 percent.

The flood plains caused by storms along Whitman Brook are not significant except for an area just north of Elm Street. The culvert under the Penn

Central Railroad is adequate to pass all flood flows studied. The culverts at Elm Street retard flood flows and cause backwater that may reach almost back to the culvert at the Penn Central Railroad tracks. The only other hydraulic consideration on Whitman Brook is the backwater from Langwater Pond at the arch bridge on the Ames property caused by peak flows on Queset Brook.

Whitman Brook is subject to additional quantities of water from two sources outside its watershed. The first source, as previously mentioned, is Dorchester Brook. The second source is Queset Brook. Runoff can enter the Whitman Brook watershed via a natural gully which originates in Ames Long Pond and flows approximately due east to a point just above the bridge under the Penn Central Railroad. The combination of these two additional sources of stream flow adds a noteworthy amount of water to the flood flow on Whitman Brook during major storms.

Queset Brook

Queset Brook is the second longest brook within Easton, being just over 26,000 feet between the Stoughton line on the north and the West Bridgewater line at the southeast. Over this distance, the brook drops 105 feet at an average effective slope of approximately 0.40 percent. Queset Brook is undoubtedly the most important brook studied in this report since its flow is affected by a multitude of man-made lakes controlled by dams and dikes and also because it flows through the most densely populated areas in Easton. The flood plains of Queset Brook are extensive.

Queset Brook in Easton originates at the spillway on Ames Long Pond and flows generally southward flooding the fields north of Canton Street during storms having 50 years of greater return frequency. On storms of greater intensity, Ames Long Pond can overflow at an area along Canton Street, and the runoff will flow across Canton Street southward and eastward towards the center of North Easton.

The 55-acre Flyaway Pond is located west of Canton Street. The dam here was breached during the flood of 1968 causing a large amount of property damage downstream.

Below the confluence of the streams from Ames Long Pond and the old Flyaway Pond, there is a small dam located just above Picker Lane. This dam provides some storage on Queset Brook. As the stream flows southward from this point, it enters Spadeshop Pond, another source of storage for Queset Brook. After leaving Spadeshop Pond, the brook passes through the congested area of North Easton, passes under several roads and flows into Shovelshop Pond. At Sullivan Street, runoff from a 500-year flood may overtop the road and flow to the intersection of Sullivan and Pond Streets, thence directly into Shovelshop Pond. A portion of the runoff, therefore, bypasses the culvert at Pond Street. Even though the flashboards on the spillway at Shovelshop Pond have been removed, there is a large storage capacity in the now empty pond.

After leaving Shovelshop Pond, Queset Brook flows into Langwater Pond where its flow is joined with that of Whitman Brook. The combined flow from these two brooks then flows over the spillway at Main Street and proceeds southward to a flat swampy area and then into the long and narrow Morse Pond. This combination of natural swamp and man-made pond provides for considerable attenuation of the peak flood flows on Queset Brook.

Black Brook

Black Brook is the longest brook within Easton, being approximately 39,000 feet long from its origin just south of Lincoln Street to the town line just east of Route 138. Along this distance, Black Brook drops approximately 120 feet at an average slope of 0.31 percent.

There are no man-made ponds along Black Brook. The flood-prone areas along the upper reaches of Black Brook are relatively narrow because of the terrain. The culverts under Summer Street and Depot Street are relatively insignificant in causing backwater that would drastically affect the flood plain areas. Between Depot Street and Prospect Street, there is a large natural swamp which provides for storage and flood flow attenuation.

At the culvert at the railroad bed just south of Prospect Street, during all storms studied, flow is directed over the southwest bank of the channel and south along the bed. After leaving this swamp at Prospect Street, Black Brook flows southward under Foundry Street and into the Hockomock Swamp.

The Hockomock Swamp is of such great size that the effects of flood flows entering this area are relatively inconsequential compared to the size of the flood plain area. It is estimated that the water level resulting from a 500-year flood would be raised in the Hockomock Swamp an average of 3 feet. This 3-foot rise in the water level in the swamp area would not significantly change the overall surface area that is always wet.

Flow within the Hockomock Swamp is slow due to the size, dense growth of vegetation and the many small culverts along the now abandoned Penn Central Railroad right-of-way and the Montaup Electric Company's access road. Outflow from the Hockomock Swamp, eastward under Route 138, is relatively small since the structure there is small and has a relatively low capacity. This arrangement provides a very efficient flood storage basin in the Hockomock Swamp, thus protecting the Taunton River area from very high peak flows.

Beaver Brook

Beaver Brook flows 12,300 feet within the town to its confluence with Poquanticut and Mulberry Brooks just below Foundry Street. In this distance, the brook drops 60 feet at an average slope of about 0.49 percent.

There is considerable natural storage on Beaver Brook above Rockland Street and a notable amount of storage area along the banks of Beaver Brook between Rockland Street and Beaver Dam Road, where a small tributary serves the area east of the brook and east of Bay Road. During major storms, artificial ponding is caused behind Rockland Street, Beaver Dam Road, and Poquanticut Avenue due to the undersized culverts.

A man-made pond, Old Pond, is located on Beaver Brook just above Foundry Street. This pond can receive additional runoff from the Poquanticut Brook watershed since there are two diversion channels from Poquanticut Brook just above New Pond down to the lower elevations of Beaver Brook at Old Pond.

Poquanticut Brook

Poquanticut Brook flows approximately 20,000 feet from the Easton-Sharon town line to its confluence with Beaver and Mulberry Brooks. In this distance, Poquanticut Brook drops 110 feet. Excluding the drop over the dam at New Pond, the average slope of Poquanticut Brook is about 0.55 percent.

Flow on the upper reaches of Poquanticut Brook is very slow because of the retarding of the flood waters provided by the storage capacity in the Upper Leach Ponds, Puds Pond, Leach Pond, the swamp below Leach Pond, and the 40-acre Seeley Meadow, all of which are north of Rockland Street.

The flows from the Upper Leach Ponds and Puds Pond can be controlled to varying degrees. The former can be regulated by a gated outlet structure at the downstream pond, and the latter by flashboards set across the spillway. Flows from Leach Pond are no longer controllable because the original gated outlet channel has been dammed off and replaced by an uncontrolled spillway.

The road in Borderland State Park just south of Leach Pond is actually a man-made dike, which provides the necessary height to form Leach Pond. Without this road, there would be no Leach Pond.

A large area of natural storage is located between Rockland Street and Massapoag Avenue in the form of swampland and a small artificial pond just south of Rockland Street next to the trailer park.

The area between Massapoag Avenue and Chestnut Street also contains considerable wetlands. Considerable storage is attained due to the constriction caused by the culvert under Chestnut Street and the ensuing backwater reaching north of this point. Downstream of Chestnut Street, there is an additional swamp area which may allow some of the flow from Poquanticut Brook to travel overland through the meadows and swamp southwestward into Gowards Brook. This flood routing probably would only occur during the 100-year and 500-year floods.

Storage and flood attenuation on Poquanticut Brook is also accomplished at New Pond where the 16-acre man-made pond can store additional water.

Mulberry Brook

Mulberry Brook, within the Town of Easton, flows 10,800 feet from the confluence of Beaver Brook and Poquanticut Brook just below Foundry Street southward to the Easton-Norton town line. In this distance, the brook drops a total of 26 feet. Excluding the drop at the Fuller-Hammond Reservoir and the 800 feet from the Reservoir to the town line, the average slope is 0.17 percent.

Mulberry Brook has relatively little swamp area along its reach within the confines of the town. Just above the Easton-Norton line, it flows into Ward Pond and then into the Fuller-Hammond Reservoir which is controlled by a dam with flashboards. This dam is relatively well maintained and controlled by the Fuller-Hammond Cranberry Company because its operation is critical to the cranberry crop.

Gowards Brook

Gowards Brook flows 8,700 feet from Eastman Street (Route 106) southward to its confluence with the Canoe River at the Easton-Norton town line. In this distance, the brook drops 42 feet at an average slope of approximately 0.48 percent.

The Gowards Brook watershed contains no ponds but does contain some wetlands. Approximately 1,800 feet downstream of its confluence with the Canoe River, culverts and a spillway at Newcomb Street in Norton cause water to back up into Easton.

There is a low point approximately 500 feet east of the town line on Red Mill Road in Easton which allows storm water to bypass the culverts at Newcomb Street. A low area, 1,000 to 1,900 feet east of the town line on Red Mill Road, allows flood water to overtop the road and pond until flooding subsides.

Developments in the Flood Plains

Generally speaking, the flood plain areas included within Easton are caused by man-made impediments. These include roadways with undersized culverts and dams with narrow constrictions caused by the diking of portions of the stream banks through which the brook flows. Flood plains caused by these physical impediments either take the shape of the natural contours or follow the contours of the dikes and dams which form the impediments. The height of water due to storms is very much influenced by the height of the dams and their accompanying dikes and/or by the profile or grade of the streets.

Most of the dams within the town have a history of being overtopped at one time or another. All the minor streets under which the eight brooks pass also have a history of being overtopped. Only the major roadways, with their accompanying large multiple box culverts or bridge spans, have not been overtopped at one time or another. Most of the railroad culverts which lie within the town seem to be adequate to handle most floods, although backwater from these culverts is a factor in all of the major floods.

In the past, development within the areas designated as flood plains was sparse. Residential development took place on various knolls and hills along the brooks, thus minimizing flood damage. Notable exceptions were the few remaining factories and a few residences built on the old foundations of water powered mills.

In recent years within the town of Easton, development has been encroaching into designated flood plains and wetlands. These activities can result not only in loss of property but can create serious health hazards resulting from possible inundation of septic sewage systems.

FLOOD SITUATION

Sources of Data and Records

There are no U.S. Geological Survey gaging stations located within the study area. However, a station located on Dorchester Brook in Brockton just upstream of Pearl Street and approximately 3,000 feet downstream of Bigney Pond was installed in 1962. The drainage area behind this gage is 4.67 square miles. Information on this gage was obtained from a report entitled, "Flood of March, 1968 in Eastern Massachusetts and Rhode Island." This information was used to develop a hydrograph and stream flow data for Dorchester Brook. The data were also used as guides to develop the runoff rates and lag times during major floods for the other brooks in the town.

To supplement the records of the gaging station, newspaper files, historical documents, and records were used; and personal interviews were conducted to obtain information concerning past floods.

The maps prepared for this report were based on U.S. Geological Survey 7 1/2 minute quadrangle sheets for Brockton, Mansfield, Norton, and Taunton. Additional or supplemental information was obtained from field survey conducted in the town and from photogrammetric maps supplied by the Massachusetts Department of Public Works.

The only known crest stage and discharge for a high-intensity flood for any of the brooks studied were recorded for the storm of 17-18 March 1968. The hydrograph has been presented in Plate 2. The stage was measured at 5.86 feet, msl.

Flood Season and Flood Characteristics

Floods have occurred in Easton during all seasons. Because of the lack of long-term records, it is believed that the storm of record occurred either in February, 1886, or in August, 1955. Peak flood stages can be expected several hours after the start of intense rainfall as has been presented in Plate 2.

Storms over the watershed are of four general types:

1. Extratropical continental storms which move under the influence of the prevailing westerly winds.

2. Extratropical maritime storms which originate over the ocean and move northward along the eastern coast of the United States.

3. Storms of tropical origin, sometimes of hurricane magnitude and intensity.

4. Thunderstorms produced by local convective action or by more general frontal movements.

Tropical storms, such as the August 1955 storm, can generate very intense rainfall, generally more intense than the winter storms. However, flooding due to summer storms is attenuated both by relatively dense foilage and swamp grass and by the relatively low runoff coefficient resulting from the low groundwater table at that time of the year. The ponds and lakes can also store more water because of the lower water levels.

Winter storms, such as the March 1968 storm, can cause severe damage. This storm did not have a record amount of rainfall but, because of antecedent conditions, produced extensive damage. Rainfall from a storm the previous week had saturated the soil; and cold temperatures, by keeping the ground frozen, prevented the water from leaching deeper into the soil. The storage capacity in ponds, lakes, and swamps was, therefore, minimal. The runoff from the storm thus approximated the total rainfall.

Factors Affecting Flooding and Its Impact

Obstructions to Flood Flows

The presence of many obstructions to the flood flows in Easton has already been mentioned. Most of these are man-made. They cause flood plains to be formed upstream of minor roads and old mill dams. Once the dam or the road has been overtopped, the increase in the flood crest is relatively small. If a road is flooded by 1 foot over its crown at a sag point, the overtopping usually encompasses a total length of several hundred feet; and, thus, the total quantity of water flowing over the road can be and usually is substantially greater than that flowing through the drainage structure.

Melting snow alone seldom produces any damaging high water in the town. A combination of warm rain and the ensuing melting snow caused some of the greatest floods on record in the town. There were no gages within the town during the floods of 1886, 1938, 1944, or 1955, but records seem to indicate that the flood of March, 1968, was as great as, or greater than, any of the above-mentioned floods.

Since many of the culverts within Easton are substantially undersized, ice flows or floating debris can be a major problem. Ice flows and ice jams have caused minor flooding or localized major flooding in the past. Debris, both floating and nonfloating, is also a relatively major problem. Large stones, old carriages, carts, tree trunks, parts of automobiles, etc. may be found on the upstream end of many of the culverts. Although the cleaning of these culverts would substantially improve the hydraulic characteristics of the existing culverts, it would not be the entire answer to the problems caused by major floods. Most culverts are of such size that even if they were perfectly clean, they could not pass any flood having over a 5- or 10-year recurrence interval.

In general, many obstructions restrict flood flows and result in banks overflowing and unpredictable areas being flooded. It is impossible to predict the location or degree of accumulation of debris. Therefore, for the purpose of this report, it was assumed that there would be no accumulation of debris to clog any of the bridges or culvert openings in the development of the flood profiles. It was also assumed that the ponds or lakes were at normal level behind each of the dams at the time of the beginning of intense rainfall. Additionally, the enlargement of a restrictive stream crossing, increasing flow capacity, tends to decrease flood stages and inundated areas upstream of the crossing, but could increase flood stages and flooded areas downstream. Therefore, the results of any Flood Plain Information Report should be reviewed periodically by appropriate state and local officials and planners to determine if changed watershed conditions significantly affect the results of the study.

Flood Storage in Swamps - The Town of Easton, because of its relatively flat topography, contains extremely large areas of swamps and wetlands. Almost 40 percent of the town is swamp, wetland, or pond.

Of this large percentage of wetlands in the town, the biggest single factor in attenuating the effects of flood flow on the various streams is the abundance of swamps. There are literally dozens of small to medium size swamps ranging in size from only a few acres to approximately 150 to 200 acres each. These swamps have a very marked effect on reducing the peak flows on downstream drainage structures and, thus, have the effect of minimizing property damage. The beneficial effect of these swamps should definitely not be overlooked when developing any additional areas for future residential or commercial use.

Flood Storage in Ponds - Most of the ponds, as previously mentioned, are man-made. The combined effect of the several ponds is quite noticeable during the peak flows from large storms. Four of these ponds are presently dry or practically dry since the dams that formed them have been breached. Three of these dams were breached during flood flows, and the dam at Monte Pond was recently intentionally breached because of poor structural conditions. The hydraulic computations for these four sites, based upon each dam being breached, generally resulted in an increase in the capacity of these ponds to store flood flows. The breaching caused the pond to be drained, thus permitting the additional storage.

The capacity of a pond to store water is a function of the size of the pond, the surrounding topography, the type of outlet structure, and the nature of the controls on the structure. A pond such as Leach Pond has little storage capacity because there is no effective way to control the water elevation. Fuller Hammond Reservoir has storage capacity because it is carefully controlled. Flyaway Pond, with its dam breached, now has considerable storage capacity because the storm runoff backs up at the constriction where its spillway was located. The constriction that was once the spillway site forces water to be stored during storms even though no control exists there. The Morse Pond has additional storage capacity because of the surrounding swamp area.

In general, the storage capacity in most ponds is a consideration, but, because there is not much freeboard at most dams or spillways, there is little remaining capacity at the time of peak runoff. Attenuation and retardation, therefore, are not a major consideration in many cases.

Flood Storage in Flood Plains - The flood plains along the various brooks studied in this report also function to attenuate the flood flows. These flood plains are not extensive and, therefore, the effective storage area is relatively minor in times of major storms.

The aforementioned swamps, ponds, and flood plains are identified and located on Plates 4 through 15.

Flood Damage Reduction Measures

There are no flood control projects constructed within Easton by any local, state, or federal agency. Previous construction by the Corps of Engineers has been limited to the replacement of culverts washed away by fast-moving flood waters.

Other Factors and Their Impacts

The Town of Easton has enacted (1973) a flood plain ordinance, found in its Zoning By-Laws, which regulates the use of the land and, more specifically, the use of the flood plains. A special permit must be obtained from the Board of Appeals when new construction is contemplated within the flood plain. Repair work, rebuilding, modernization, and enlargement are allowed within the owner's lot without the need for obtaining approval by the Board. The impact of this ordinance has been to curtail development within the flood plain.

In general, culverts in Easton are undersized, and the flood plains, by retaining flood waters, help to protect houses, buildings, and roads from being damaged. The filling in of the flood plains would thus result in significant increases in damages during periods of heavy rainfall.

Flood Warning and Forecasting - The U.S. Department of Commerce, National Weather Service, is responsible for forecasting high water on the nation's rivers and for issuing flood warnings for the protection of life and property. The National Weather Service River Forecast Center at Hartford, Connecticut, is responsible for issuing flood warnings for the Taunton River basin. Flood warnings and anticipated weather conditions are issued by the National Weather Service to city officials, radio, and television stations and the local press media for further dissemination to residents of the area. Flood warnings for Easton are carried out by the civil defense agency working in conjunction with the police and fire departments. When the National Weather Service's forecasts indicate high water stages can be expected, observations of brooks are made at strategic locations.

Flood Fighting and Emergency Evacuation Plans - There are no formal flood fighting or emergency evacuation plans for the Easton area.

Provisions for alerting area residents and coordinating operations of town, county, and state public service agencies in time of emergency are accomplished through the civil defense agency. This agency maintains communications with police headquarters where a radio watch is maintained 24 hours a day. Information on flood preparation or evacuation is disseminated through commercial broadcast stations, television, and news media and, if necessary, via public address systems on the police cruisers sent to the threatened areas. Responsible authorities should consider methods of fire fighting in buildings isolated by floods which cannot be reached by conventional fire-fighting equipment.

Material Storage on the Flood Plain - Easton has enacted a flood plain ordinance, and, because much of the lands within the flood plain are not suitable for development, land utilization for residential and commercial purposes has been minimized. However, as cranberries require water for harvesting, they are grown in more than one location within the flood plain. Materials such as lumber, petroleum, and petroleum-related items, plastics, and building products are not stored in any sizable amounts within the flood plains.

PAST FLOODS

Summary of Historical Floods

Some information has been obtained on the floods of February, 1886, March, 1936, September, 1938, August, 1955, and March, 1968. Because the Dorchester Brook gage was installed in 1962, there is no definitive information on the extent or severity of the historical floods prior to 1968. Historical information obtained is relative; and, of course, the situation in the town has changed over the past 89 years since the flood of 1886.

Correlation of all the information available indicates that the storm of August, 1955, was actually the most severe flood of record as far as peak flows on the various brooks were concerned and total quantity of water passing along those streams over the entire duration of the storm. The flood of 1968 did the most physical damage, attributable to the breaching of the dam at Flyaway Pond which sent a wall of water careening down Queset Brook into the center of North Easton.

Flood Records

Data from the Dorchester Brook gaging station were used extensively in developing the hydraulic analyses for the brooks studied.

High water marks of past floods were obtained at several locations from residents who live along streams and had somehow marked the high water points or remembered them quite vividly. Historical documents were researched in local libraries and some information was obtained from local newspapers.

Flood Descriptions

The following are descriptions of known large floods that have occurred in the Town of Easton.

Flood of February, 1886

The flood of February, 1886, was very similar to the flood of March, 1968. Approximately, 7 inches of rainfall fell during the storm and the melting of the existing snow added about another 3 inches of water. As the ground was frozen, the coefficient of runoff was high and water gathered rapidly in the various streams, lakes, and swamps.

The areas of flood damage were similar in location in 1886 to those in 1968. The dam and dike at Ames Long Pond was in danger of washing out and, only through the efforts of many men working throughout the evening of February 12th, was the dam saved. The water, however, overtopped Canton Street above Picker Lane and washed down into Queset Brook. The brook caused a wash-out of the railroad crossing above Elm Street and overtopped Main Street in North Easton washing it out and rendering it impassable to vehicles. The upper end of the arch of Ames Stone Bridge was undermined. There was a wash-out on Turnpike Street (Route 138) of about 30 feet in width and about 10 feet in depth. This was the most serious damage inflicted at any one location.

The dam at what is now called New Pond was overtopped and only preventative measures by the local town folk kept it from being washed out. As shown in Figure 1, Foundry Street, just below the dam, was washed out due to the overtopping of the dam and the extreme erosive action of the water.

The dam at Old Pond did give way and caused considerable damage downstream.

Figure 1 - Poquanticut Brook Station 25+00. Photograph of damage to Foundry Street at New Pond. (Courtesy of Mr. Clifford Grant)

Generally, all over the town, small roads were overtopped and several small bridges were washed away. The little pools and ponds and swampy areas became broad lakes and the small streams formed raging torrents. In North Easton, many cellars were flooded, some of them having 3 to 4 feet of water.

Flood of March, 1936

In March of 1936, there were two floods in the town. The second flood proved to be of slightly greater magnitude than the first since the reservoirs, ponds, and swamps were still relatively full due to the effects of the previous storm. Also, runoff from the second storm was higher than that of the first storm since the ground was already saturated.

It appears that the same areas of Queset, Beaver, Poquanticut, and Black Brooks were trouble spots in 1936 as they were in the flood of 1886. The extent of damage was minimal and actual locations of damage were fewer for these floods; they were not considered to be of any major importance.

Flood of September, 1938

The flood of 1938 was produced by a hurricane. Antecedent rainfall and runoff had filled most of the natural storage areas in the basins by the time the most intense rainfall fell. As a result, the time sequence of this hurricane storm was conducive to high peak discharges.

Flood of August, 1955

The flood of August, 1955, actually produced the greatest known flows on most of the brooks within Easton. The damage due to this flood was not as great as that incurred during some other floods since none of the major dams were breached and, therefore, the "wall of water," which did tremendous damage during other floods, did not occur in 1955. Total volume of runoff from the entire flood was considerably greater than from any other known flood.

Total rainfall during the flood of August, 1955, was almost 18 inches but the coefficient of runoff was relatively low because the ground was not frozen and there was no immediate antecedent rainfall to saturate the ground. Retardation and attenuation of peak flood flows were also more significant because summer foliage and swamp grass were still in full bloom.

In August, 1955, most of the major dams in the town were overtopped to some extent. Because of high flood crests overflowing banks, large volumes of water traveled overland from one brook to another. Flood waters flowed around the end of dams and overtopped bridges. The dam at Old Pond was saved because the flashboards were removed with dynamite. The dam at New Pond was saved when a channel was cut along the western end of the stone dam. Most of the minor secondary roads in the town were overtopped, and vast areas of the town were left underwater for a short period of time. Since the stream flood flow in Easton is relatively slow, damage due to stream velocity was minimal. Damage due to flood plain depth was also minimal since, with the exception of the area around North Easton, most of the buildings in the town at that time were on land that was above the flood plain.

Flood of March, 1968

The flood of March, 1968, caused extensive damage within the town. This was mainly due to the breaching of the dam at Flyaway Pond as is shown in Figure 2, which sent a wall of water down Queset Brook into the center of North Easton as is shown in Figures 3 and 4. The effects of the dam failure were felt all the way up to Elm Street at Whitman Brook where the water rose between 1 and 2 feet.

The flood of March, 1968, was similar to the other floods in that almost all the dams and secondary streets in the town were overtopped. The dams at French Pond and at Monte Pond were both overtopped and water in both ponds flowed around the dams and over the roadways below. Torrey Street in Brockton, an extension of Main Street in Easton, was overtopped due to the swelling of Bigney Pond.

The water in Ames Long Pond rose to approximately the top of the embankment and dike at the east end of the pond and just barely ran over into Canton Street and on down into Queset Brook below. Flood waters from Long Pond flowed into Whitman Brook near the railroad bridge. The dams at New Pond, as shown in Figure 5, and Old Pond overtopped during this storm. Foundry Street was overtopped and some damage was experienced.

The flood of 1968 was considered to be a 50-year return frequency flood, although it was caused by only approximately 6.5 to 7 inches of rainfall over a 24-hour period. The flood of 1968 was similar to the flood of 1886 for it occurred when the ground was frozen and covered with snow.

Figure 2 - Tributary to Queset Brook. Results of breaching of Flyaway Pond. (1968 Photo by Mr. Allan Watts)

Figure 3 - Queset Brook Station 192+00. Photograph of floodwaters at Main Street in North Easton. Note water coming over wall. (Photo by Mr. Stanley Bauman)

Figure 4 - Queset Brook Station 183+00. Photograph of flooding and damage at Pond Street. (Courtesy of Mr. Allan Watts)

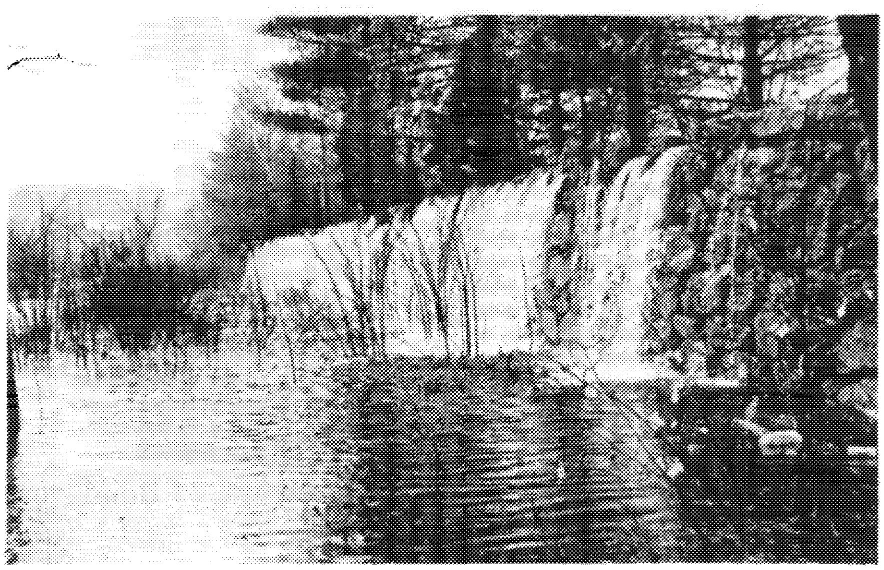


Figure 5 - Poquanticut Brook Station 25+00. Photograph of New Pond at Foundry Street being overtopped. (Courtesy of Mr. Allan Watts)

The melting of snow cover resulted in additional runoff. Also, the antecedent condition of the ground being frozen caused a particularly high rate of runoff.

Property damage in 1968 was greater than the property damage experienced during the flood of 1955, both because of the failure of the dam at Flyaway Pond and because, during the 13-year interval, a moderate amount of building had taken place in flood plains. Damage to real estate in the low land areas was considerably higher than that to real estate on the higher grounds.

Additional examples of flooded areas are presented in Figures 6 through 9.

Figure 6 - Queset Brook vicinity of Station 85+00. Photograph of floodwaters and melting snow cover behind Short Street. (Courtesy of Mr. Allan Watts)

Figure 7 - Queset Brook vicinity of Station 85+00. Photograph of Morse Pond overtopping into the surrounding low areas.

Figure 8 - Mulberry Brook Station 33+00. Photograph of floodwaters at Ward Pond in Wheaton Farm. Note ice sheets. (Courtesy of Mr. Allan Watts)

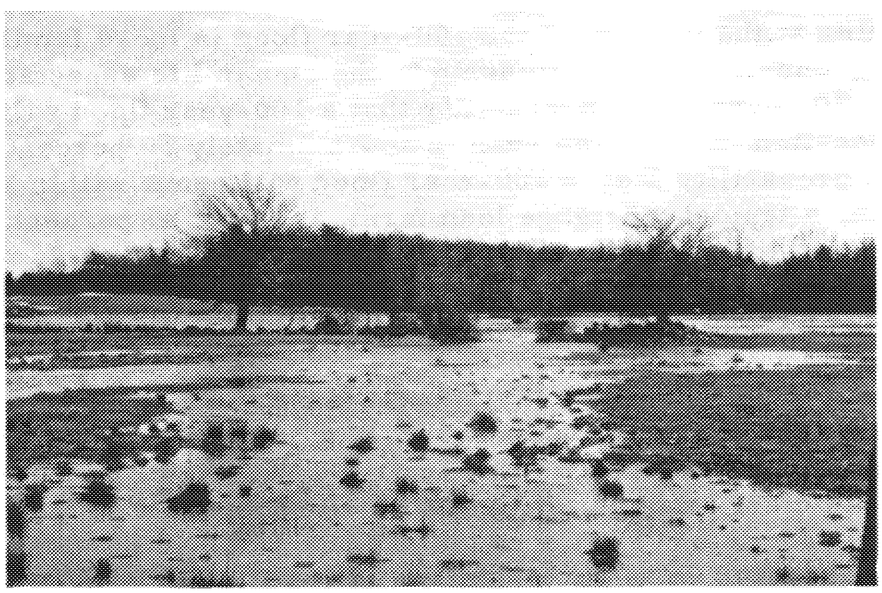


Figure 9 - An example of a flooded meadow. (Courtesy of Mr. Allan Watts)

FUTURE FLOODS

Floods of the same or larger magnitudes as those that have occurred in the past could occur in the future. Larger floods have been experienced in the past on streams with similar geographical and physiographical characteristics as those found in the study area. Similar combinations of rainfall and runoff which caused these floods could occur in the study area. Therefore, to determine the flooding potential of the study area, it was necessary to consider storms and floods that have occurred in regions of like topography, watershed cover, and physical characteristics. Discussion of the future floods in this report is limited to those that have been designated as the 100-Year and 500-Year Floods. Since future changes within stream basins cannot be accurately predicted, in this report, estimates for these events are based on development existing within the subject watersheds at the inauguration of this study.

Flood Magnitudes and Their Frequencies

The 100-year flood is defined as one that could be equalled or exceeded on the average once in 100 years. This does not mean that a flood of this magnitude must occur once and only once every 100 years, but rather that in any given year, there is a 1 percent chance of the 100-year flood occurring. The limits of this flood are used by Federal agencies, states, cities, and towns as minimum criteria in establishing flood plain zoning. Looking at the concept of the 100-year flood in more familiar time intervals, consider its relationship to the human life expectancy of approximately 70 years. The probability that a 100-year flood will occur at a specific location in this time span is approximately 50 percent. Similarly, the probability that a 100-year flood will occur within a 30 year time span, a typical mortgage loan term, is about 25 percent. In a similar manner, the 500-year flood is defined as one that could be equalled or exceeded on the average once in 500 years. Thus, a 500-year flood would have a 0.2 percent chance of occurring in any given year.

Frequency analysis provides the means whereby the discharge or stage value of floods for any desired recurrence interval may be determined provided that sufficient data are available with which to make the analysis. If sufficient records are available, it is possible to make a reasonably accurate determination of the average interval of occurrence of floods to be expected up to the magnitude of the 100-year flood. Frequencies of floods equivalent to the 500-year and larger can be obtained through extrapolation. Such floods would be rare events, but could occur at any time. Floods larger than the 500-year flood are possible, but the combination of factors necessary to produce such a large flood seldom occurs. However, floods of these larger magnitudes should not be overlooked in any study of flood problems relating to extensive development or where considerable danger to human life exists.

Hazards of Large Floods

The extent of damage caused by any flood depends on the topography of the area flooded, depth and duration of flooding, velocity of flow, rate of rise, and developments in the flood plain. A 100-year flood or 500-year flood in Easton would result in inundation of residential, commercial, and industrial sections in some parts of the study area. Deep floodwater flowing at high velocity and carrying floating debris would create conditions hazardous to persons and vehicles attempting to cross flooded areas. In general, floodwater 3 or more feet deep and flowing at a velocity of 3 or more feet per second could easily sweep an adult person off his feet, thus creating definite danger of injury or drowning. Rapidly rising and swiftly flowing floodwater may trap persons in homes that are ultimately destroyed or in vehicles that are ultimately submerged or floated. Water lines can be ruptured by deposits of debris and the force of floodwaters, thus creating the possibility of contaminated domestic water supplies. Damage to individual septic tanks and cesspools can result in the pollution of floodwaters creating health hazards. Additionally, isolation of areas by floodwater can create hazards in terms of medical, fire, or law enforcement emergencies.

Flooded Areas and Flood Damages

The areas in Easton that are subject to flooding by the 500-year flood are shown on Plate 2 which is also an index map to the following plates. Areas that would be flooded by the 100-year and 500-year floods are shown in detail on Plates 4 through 15. The actual limits of these overflow areas may vary somewhat from those shown on the maps because the 10-foot contour interval and scale of the maps do not permit precise plotting of the flooded area boundaries. These plates show the parts that would be covered by the 100-year and 500-year floods during floodflows. The areas that would be flooded include commercial, industrial, and residential sections and the associated streets, roads, and public and private utilities. Considerable damage to these facilities could occur during floods.

The flood of record in Easton occurred in August, 1955. Though no estimate of damages was made, indirect damages such as loss of business with consequent unemployment and disruption of transportation and communications with resultant inconvenience to the public and industry occurred, as well as direct damages to industrial buildings, highway bridges, road washouts, destruction of homes and stores, and destruction of farmland. In dollar values a recurrence of this flood would cause even greater losses because of costs today compared to those current in 1955. A study of Plates 4 through 15 will show where future floods could extend and where existing or future buildings could suffer considerable damages.

Obstructions

During floods, debris collecting on bridges and culverts could decrease their carrying capacity and cause greater water depths (backwater effect) upstream of these structures. Since the occurrence and amount of debris are indeterminate factors, only the physical characteristics of the structures were considered in preparing profiles of the 100-year and 500-year floods. Similarly, the maps of flooded areas show the backwater effect of obstructive bridges and culverts but do not reflect increased water surface elevation that could be caused by debris collecting against the structures or by deposition of silt in the stream channel near structures.

Tables 2 through 9 list the culverts and bridges along the brook and show their relationship to the 100-year and 500-year floods. Tables 10 through 17 list the peak discharges for the 100-year flood for various locations along the brooks. Also, these tables give the percent storage area to total drainage area for each of these checkpoints.

Velocities of Flow

Water velocities during floods depend largely on the size and shape of the cross sections, conditions of the stream, and the bed slope, all of which vary on different streams and at different locations on the same stream. During a 100-year flood, velocities in the main channel would be from 6 to 9 feet per second. Water flowing at this rate is capable of causing severe erosion to stream banks and fill around bridge abutments and of transporting large objects.

It is expected that velocities would be somewhat higher during a 500-year flood than during a 100-year flood. Velocities would average 8 to

12 feet per second. Water flowing at 2 feet per second or less would deposit debris and silt.

Rate of Rise and Duration of Flooding

It has been demonstrated that flooding can be expected in several areas throughout the town. The nature of the drainage structure and the storage area determine how quickly the water rises and how long high water will last.

For a given discharge, if a drainage structure is small, the water behind it will generally rise quickly until it tops the locally high area. If the storage area is small, the duration of flooding will not be long. For the same discharge, if the storage capacity is large, the duration of flooding will be longer, but the flood crest may be lower.

Even when a culvert is sufficiently large to pass the flood flow, there will be some rise in the water level as the rate of runoff increases. Because the brook channel above a large culvert is generally so well defined, little damage would be anticipated in these areas.

The gaging station on Dorchester Brook recorded the peak flow during the 1968 storm 21 hours after runoff attributed solely to the storm began. Hydrological and hydraulic calculations, using this value as a guide, indicate that peaking times at either points of confluence or at points where brooks cross the town line vary from 13 to 24 hours.

Photographs, Future Flood Heights

The levels that the 100-year and 500-year floods are expected to reach at selected locations in the town are indicated on Figures 10 through 26 and in Plates 16 through 25.

TABLE 2

ELEVATION DATA
DAMS AND CULVERTS ALONG DORCHESTER BROOK

IDENTIFICATION	STATION (measured in ft. U/S from Brockton Corporate Boundary)	ELEVATION OF TOP OF OPENING (Ft. msl)	WATER SURFACE ELEVATION	
			INTERMEDIATE REGIONAL FLOOD (Ft. msl)	500-YEAR FLOOD (Ft. msl)
Elm Street	30+00	130.5	130.4	130.6
Monte Pond Spillway	30+50	134.0	135.0	135.2
Union Street	76+50	178.2	171.1	173.5
French Pond Spillway	76+50	178.8	178.8	178.9

TABLE 3

ELEVATION DATA
DAMS AND CULVERTS ALONG WHITMAN BROOK

IDENTIFICATION	STATION (feet above confluence with Queset Brook)	ELEVATION OF TOP OF OPENING (Ft. msl)	WATER SURFACE ELEVATION	
			INTERMEDIATE REGIONAL FLOOD (Ft. msl)	500-YEAR FLOOD (Ft. msl)
Private Road Ames Estate	7+00	123.7	123.4	125.0
Elm Street	18+00	123.1	124.3	126.3
Railroad Bridge	53+00	136.1	130.5	131.5

TABLE 4

ELEVATION DATA
DAMS AND CULVERTS ALONG QUESET BROOK

IDENTIFICATION	STATION (measured in ft. U/S from West Bridge-water Town Line)	ELEVATION OF TOP OF OPENING (Ft. msl)	WATER SURFACE ELEVATION	
			INTERMEDIATE REGIONAL FLOOD (Ft. msl)	500-YEAR FLOOD (Ft. msl)
Turnpike Street	1+00	85.6	80.4	81.0
Dean Pond Spillway	31+00	93.4	95.3	96.7
Washington Street (Route 138)	40+00	100.8	100.2	102.4
Central Street	52+50	99.1	100.1	102.4
Morse Pond Spillway	53+50	107.6	108.7	108.9
Main Street	155+50	117.0	123.7	124.5
Langwater Pond Spillway	156+00	121.5	123.7	124.5
Shovelshop Pond Spillway (Breached)	174+00	126.0	133.7	134.3
Pond Street	183+50	135.0	137.4	137.7
Mechanic Street	185+50	134.1	137.4	137.7

TABLE 4 (Continued)

ELEVATION DATA
DAMS AND CULVERTS ALONG QUESET BROOK

IDENTIFICATION	STATION (measured in ft. U/S from West Bridge-water Town Line)	ELEVATION OF TOP OF OPENING (Ft. msl)	WATER SURFACE ELEVATION INTERMEDIATE REGIONAL FLOOD (Ft. msl)	WATER SURFACE ELEVATION 500-YEAR FLOOD (Ft. msl)
Sullivan Street	186+00	136.0	139.0	140.3
Railroad Bridge	186+50	141.1	139.0	140.3
Main Street	191+00	139.0	143.2	143.8
Private Road	196+00	144.0	147.2	148.5
Spillway at Unnamed Pond	201+00	146.7	150.2	150.3
Spadeshop Pond Spillway	209+00	156.0	159.4	160.2
Picker Lane	218+00	163.8	162.3	162.6
Picker Pond Spillway	219+50	166.9	167.0	167.2
Canton Street	237+00	169.4	172.6	175.2
Long Pond Spillway	251+50	180.9	181.6	181.9

TABLE 5

ELEVATION DATA
DAMS AND CULVERTS ALONG BLACK BROOK

IDENTIFICATION	STATION (measured in ft. U/S from West Bridge-water Town Line)	ELEVATION OF TOP OF OPENING (Ft. msl)	WATER SURFACE ELEVATION INTERMEDIATE REGIONAL FLOOD (Ft. msl)	500-YEAR FLOOD (Ft. msl)
Route 138	45+00	66.5	68.6	69.8
Railroad Bridge	90+00	71.8	69.8	70.8
Foundry Street (Route 106)	146+00	74.4	77.5	77.5
Railroad Crossing	177+00	77.1	79.0	79.2
Railroad Bridge	196+00	84.2	84.3	84.5
Prospect Street	198+00	85.8	88.2	88.4
Depot Street	273+00	119.7	122.2	123.0
Sumner Street	341+00	147.2	147.8	148.8
Randall Street	362+00	161.0	162.1	162.2

TABLE 6

ELEVATION DATA
DAMS AND CULVERTS ALONG BEAVER BROOK

IDENTIFICATION	STATION (feet above confluence with Mulberry and Poquanticut Brook)	ELEVATION OF TOP OF OPENING (Ft. msl)	WATER SURFACE ELEVATION INTERMEDIATE REGIONAL FLOOD (Ft. msl)	500-YEAR FLOOD (Ft. msl)
Foundry Street	12+00	107.3	104.6	105.7
Old Pond	14+00	112.8	115.5	115.7
Poquanticut Avenue	40+00	124.4	126.7	126.8
Beaver Dam Road	47+00	132.7	133.8	134.5
Dirt Road	92+50	147.6	148.2	149.1
Bay Road	104+00	158.8	160.7	160.8
Pheasant Lane	107+50	165.4	164.7	164.9
Kingsley Road	129+00	180.9	179.0	179.5

TABLE 7

ELEVATION DATA
DAMS AND CULVERTS ALONG POQUANTICUT BROOK

IDENTIFICATION	STATION (feet above confluence with Beaver and Mulberry Brooks)	ELEVATION OF TOP OF OPENING (Ft. msl)	WATER SURFACE ELEVATION INTERMEDIATE REGIONAL FLOOD (Ft. msl)	WATER SURFACE ELEVATION 500-YEAR FLOOD (Ft. msl)
Foundry Street	24+50	128.7	126.4	126.5
New Pond	25+50	134.1	137.3	137.9
Chestnut Street	80+00	147.0	147.8	148.0
Massapoag Avenue	116+50	161.9	162.8	163.0
Mill Pond	135+50	176.8	177.2	177.9
Rockland Street	141+00	179.5	181.9	182.2
Gravel Road	185+00	200.5	201.2	201.8
Leach Pond	195+50	205.1	205.6	205.7

TABLE 8

ELEVATION DATA
DAMS AND CULVERTS ALONG MULBERRY BROOK

IDENTIFICATION	STATION (measured in ft. U/S from Norton Town Line)	ELEVATION OF TOP OF OPENING (Ft. msl)	WATER SURFACE ELEVATION INTERMEDIATE REGIONAL FLOOD (Ft. msl)	500-YEAR FLOOD (Ft. msl)
Fuller Hammond Reservoir	8+00	73.4	76.0	78.0
Ward Pond	35+00	80.4	81.4	82.0
Highland Street	95+50	92.3	91.6	94.0
South Street	105+00	92.0	94.2	95.0

TABLE 9

ELEVATION DATA
DAMS AND CULVERTS ALONG GOWARDS BROOK

IDENTIFICATION	STATION (measured in ft. U/S from Norton Town Line)	ELEVATION OF TOP OF OPENING (Ft. msl)	WATER SURFACE ELEVATION	
			INTERMEDIATE REGIONAL FLOOD (Ft. msl)	500-YEAR FLOOD (Ft. msl)
Norton Avenue	29+00	93.4	98.3	98.5
Highland Street	74+50	133.2	135.7	138.8
Eastman Street (Route 106)	87+00	138.2	136.0	139.0

TABLE 10

PEAK FLOWS
DORCHESTER BROOK

IDENTIFICATION	AREA - UPSTREAM OF LOCATION				FLOW IN CFS FOR INTERMEDIATE REGIONAL FLOOD
	TOTAL		PERCENT SWAMP	PERCENT POND	
	ACRES	SQ. MILES			
Swamp Above French Pond	1,224	1.9	13	0	250
French Pond	1,274	2.0	13	12	260
Swamp Above Monte Pond	2,024	3.2	15	12	300
Monte Pond	2,049	3.2	15	12	305
Bigney Pond	2,539	4.0	14	19	365

TABLE 11

PEAK FLOWS
WHITMAN BROOK

IDENTIFICATION	AREA - UPSTREAM OF LOCATION				FLOW IN CFS FOR INTERMEDIATE REGIONAL FLOOD
	TOTAL		PERCENT SWAMP	PERCENT POND	
	ACRES	SQ. MILES			
Railroad Bridge	995	1.6	16.3	0	300
Elm Street	1,824	2.8	11.5	3.5	380
Arch Bridge - Ames Estate	1,907	3.0	10.9	6.5	400

TABLE 12

PEAK FLOWS
QUESET BROOK

IDENTIFICATION	AREA - UPSTREAM OF LOCATION				FLOW IN CFS FOR INTERMEDIATE REGIONAL FLOOD
	TOTAL		PERCENT SWAMP	PERCENT POND	
	ACRES	SQ. MILES			
Long Pond	1,771	2.8	4.3	5.6	350
Canton Street	1,826	2.8	4.2	5.5	350
Flyaway Pond	675	1.0	25.9	0	220
Picker Pond	2,525	4.0	9.9	4.0	480
Picker Lane	2,571	4.0	9.8	4.0	480
Spadeshop Pond	2,607	4.1	9.6	4.0	485
Pond (Unnamed)	2,705	4.2	9.3	3.9	500
Private Road	2,714	4.2	9.2	3.9	510
Main Street	2,730	4.3	9.2	3.9	510
Sullivan Street	2,745	4.3	9.1	3.8	520
Pond Street	2,759	4.3	9.1	3.8	520
Shovelshop Pond	2,814	4.4	8.9	3.8	520
Main Street	4,800	7.5	9.6	2.3	675
Morse Pond	6,090	9.5	9.6	2.2	725
Central Street	6,091	9.5	9.6	2.2	725
Washington Street	6,272	9.8	9.3	2.1	725

TABLE 12

PEAK FLOWS
QUESET BROOK
(Continued)

IDENTIFICATION	AREA - UPSTREAM OF LOCATION				FLOW IN CFS FOR INTERMEDIATE REGIONAL FLOOD
	TOTAL		PERCENT SWAMP	PERCENT POND	
	ACRES	SQ. MILES			
Dean Pond	6,403	10.0	9.3	2.1	735
Turnpike Street	6,703	10.5	9.2	2.0	760

TABLE 13

PEAK FLOWS
BLACK BROOK

	AREA - UPSTREAM OF LOCATION				FLOW IN CFS FOR INTERMEDIATE REGIONAL FLOOD
	TOTAL		PERCENT	PERCENT	
IDENTIFICATION	ACRES	SQ. MILES	SWAMP	POND	
Randall Street	367	0.6	15	0	145
Summer Street	473	0.7	12.7	0	180
Depot Street	830	1.3	10.4	0	265
Prospect Street	2,199	3.4	16.3	0	480
Railroad Bed, 300 Feet South of Prospect Street	2,201	3.4	16.3	0	480
Railroad Bed, 1,800 Feet South of Prospect Street	2,256	3.5	15.9	0	485
Foundry Street	3,647	5.7	10.3	0	615
Turnpike Street	5,260	8.2	*	*	505

*Beyond scope of report due to size of Hockomock Swamp.

TABLE 14

PEAK FLOWS
BEAVER BROOK

IDENTIFICATION	AREA - UPSTREAM OF LOCATION: TOTAL ACRES	AREA - UPSTREAM OF LOCATION: TOTAL SQ. MILES	AREA - UPSTREAM OF LOCATION: PERCENT SWAMP	AREA - UPSTREAM OF LOCATION: PERCENT POND	FLOW IN CFS FOR INTERMEDIATE REGIONAL FLOOD
Rockland Street	315	0.5	16.8	0.6	65
Power Lines, 2,200 Feet West of Bay Road	427	0.7	12.4	0.5	80
Kingsley Road	119	0.2	0	0	35
Pheasant Lane	175	0.3	0	0	40
Bay Road	183	0.3	0	0	45
Power Line, 400 Feet West of Bay Road	351	0.6	0	0	70
Beaver Dam Road	1,117	1.7	6.8	0.4	155
Poquanticut Avenue	1,122	1.8	6.8	0.4	155
Old Pond	1,306	2.1	5.8	3.8	175
Foundry Road	1,400	2.2	5.4	3.6	180
Beaver and Mulberry Brooks Confluence	1,440	2.3	5.3	3.5	185

TABLE 15

PEAK FLOWS
POQUANTICUT BROOK

IDENTIFICATION	AREA - UPSTREAM OF LOCATION				FLOW IN CFS FOR INTERMEDIATE REGIONAL FLOOD
	TOTAL		PERCENT SWAMP	PERCENT POND	
	ACRES	SQ. MILES			
Leach Pond	1,515	2.4	8.9	10.8	275
Gravel Road	1,598	2.5	9.6	10.2	290
Rockland Street	1,890	3.0	10.0	8.7	320
Mill Pond	1,901	3.0	10.0	8.6	320
Massapoag Street	2,299	3.6	14.1	7.1	370
Chestnut Street	3,162	4.9	11.8	5.2	460
New Pond	3,478	5.4	13.2	5.2	490
Foundry Street	3,480	5.4	13.2	5.2	490
Mulberry and Beaver Brooks Confluence	3,603	5.6	12.8	5.0	500

TABLE 16

PEAK FLOWS
MULBERRY BROOK

IDENTIFICATION	AREA - UPSTREAM OF LOCATION				FLOW IN CFS FOR INTERMEDIATE REGIONAL FLOOD
	TOTAL		PERCENT SWAMP	PERCENT POND	
	ACRES	SQ. MILES			
South Street	5,062	7.9	0.2	0.4	680
Highland Street	5,377	8.4	0.1	0.4	700
Ward Pond	6,007	9.4	1.0	0.4	770
Fuller-Hammond Reservoir	6,567	10.3	0.9	0.4	820

TABLE 17

PEAK FLOWS
GOWARDS BROOK

IDENTIFICATION	AREA - UPSTREAM OF LOCATION				FLOW IN CFS FOR INTERMEDIATE REGIONAL FLOOD
	TOTAL		PERCENT SWAMP	PERCENT POND	
	ACRES	SQ. MILES			
Eastman Street (Route 106)	440	0.7	17	0	80
Highland Street	745	1.2	15	0	110
Norton Avenue	985	1.5	12	0	135

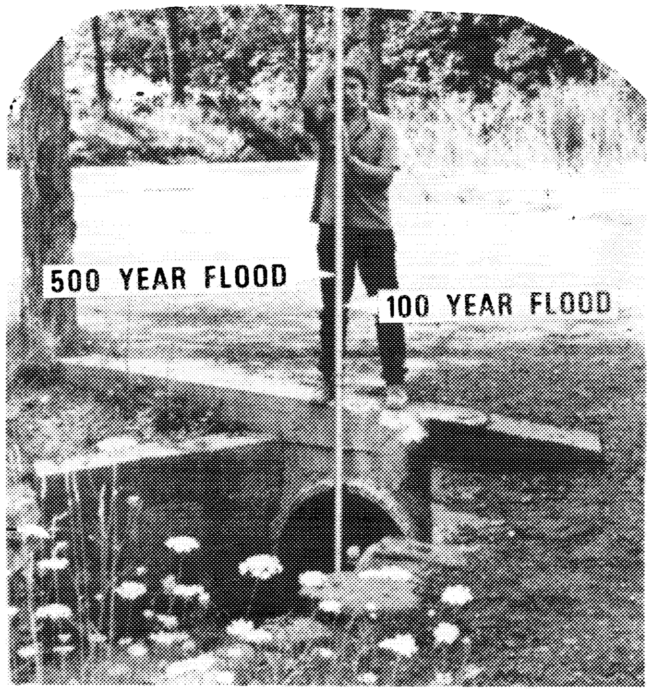


FIGURE 10 - Dorchester Brook, Station 78+00. Future flood heights at culvert on west side of French Pond.

FIGURE 11 - Dorchester Brook, Station 31+00. Future flood heights at breached dam of Monte Pond.

FIGURE 12 - Dorchester Brook, Station 0+00. Future flood heights at Bigney Pond just north of Torrey Street in Brockton.

FIGURE 13 - Queset Brook, Station 251+50. Future flood heights at spillway of Ames Long Pond.

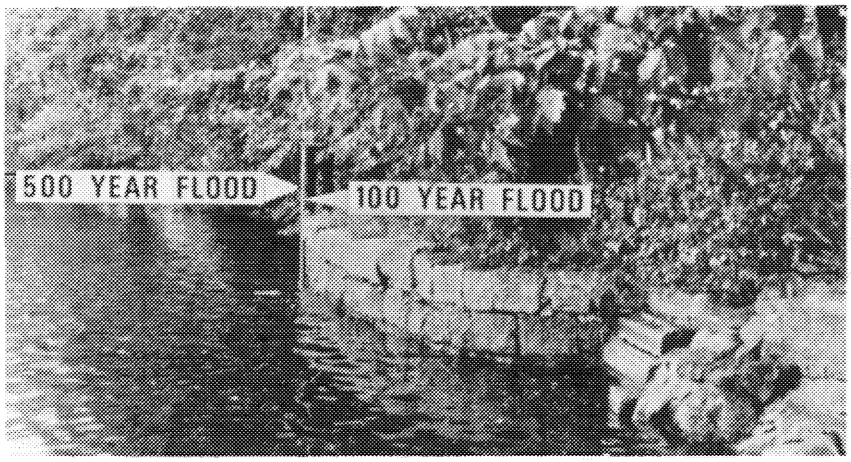


FIGURE 14 - Queset Brook near Station 243+00. Future flood heights at southern end of Ames Long Pond

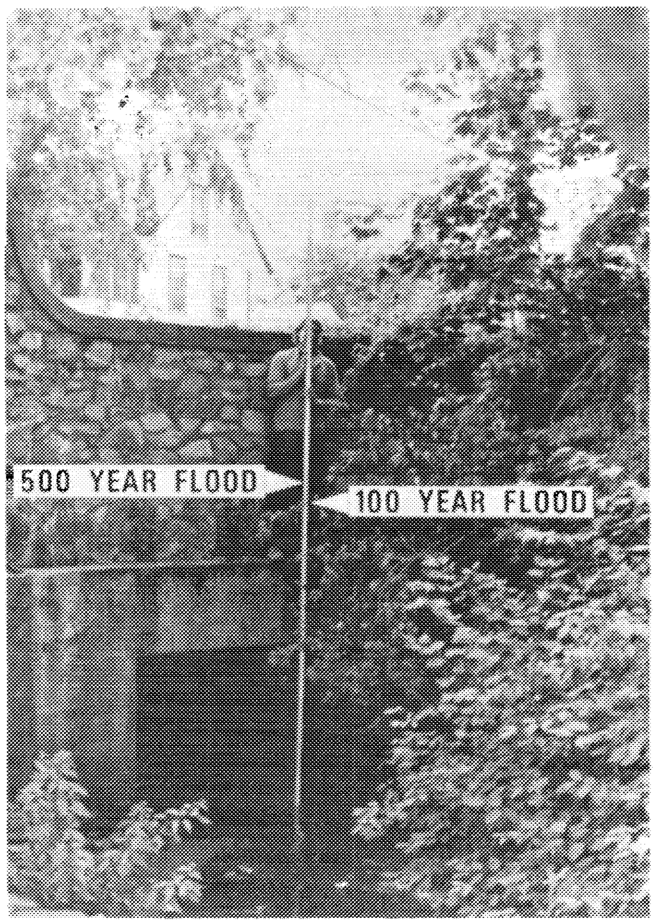


FIGURE 15 - Queset Brook, Station 191+00. Future flood heights at Main Street.

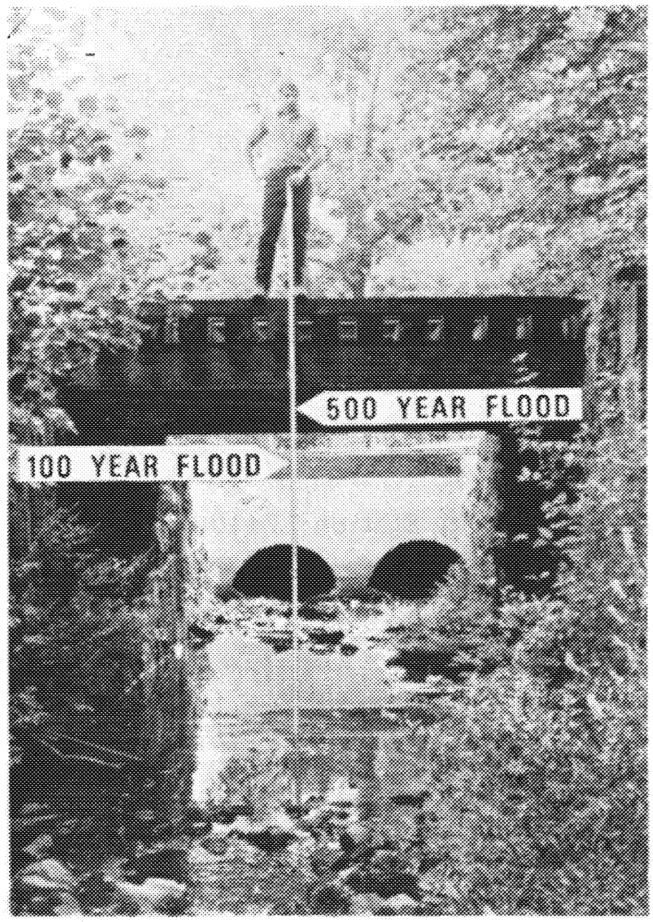


FIGURE 16 - Queset Brook, Station 186+00.
Future flood heights at railroad bridge just upstream of Sullivan Street and at culverts of Sullivan Street.

FIGURE 17 - Queset Brook, Station 174+00. Future flood heights at breached dam at Shovelshop Pond.

FIGURE 18 - Queset Brook, Station 156+00. Future flood heights at Langwater Pond and Main Street.

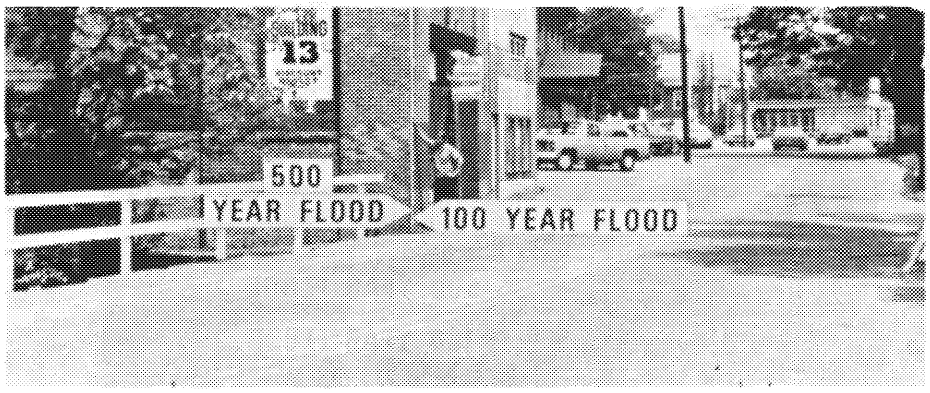


FIGURE 19 - Queset Brook, Station 56+00. Future flood heights at Central Street.

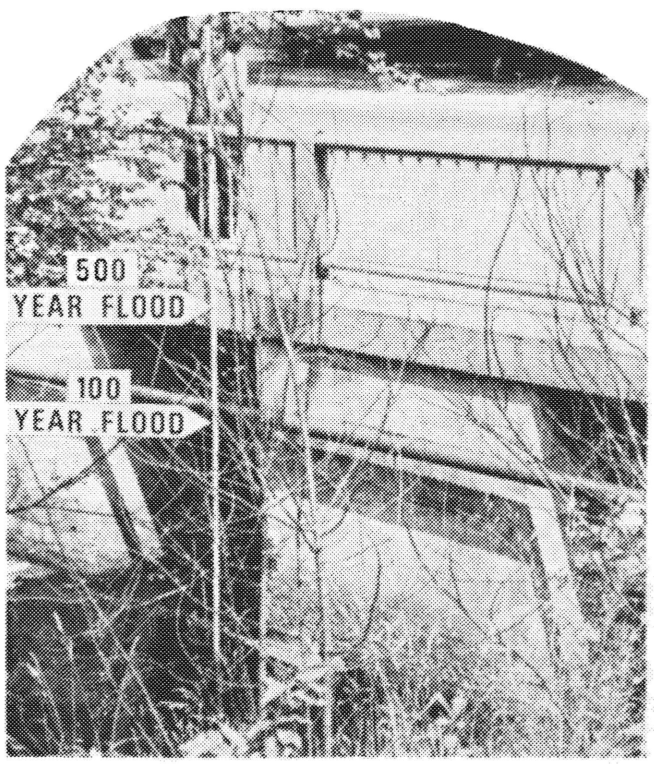


FIGURE 20 - Queset Brook, Station 44+00. Future flood heights at Washington Street (Rte. 138).

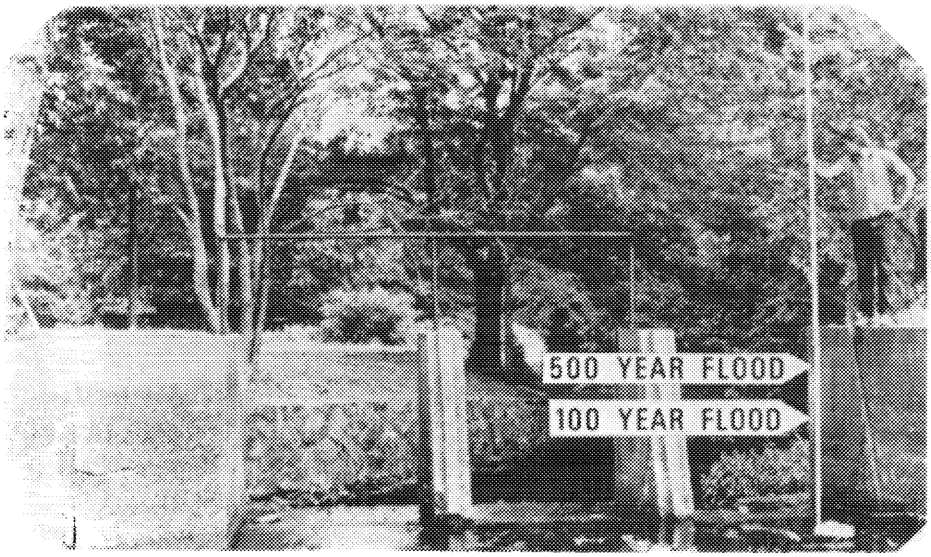


FIGURE 21 - Queset Brook, Station 34+00. Future flood heights at breached spillway of Dean Pond, Site A.

FIGURE 22 - Queset Brook, Station 34+00. Future flood heights at breached spillway of Dean Pond, Site B.

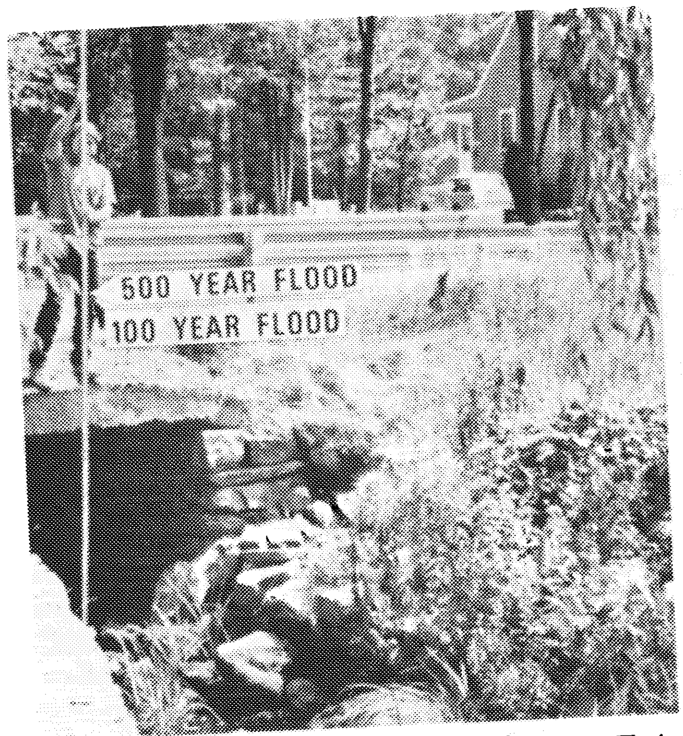


FIGURE 23 - Black Brook, Station 198+00. Future flood heights at Prospect Street.

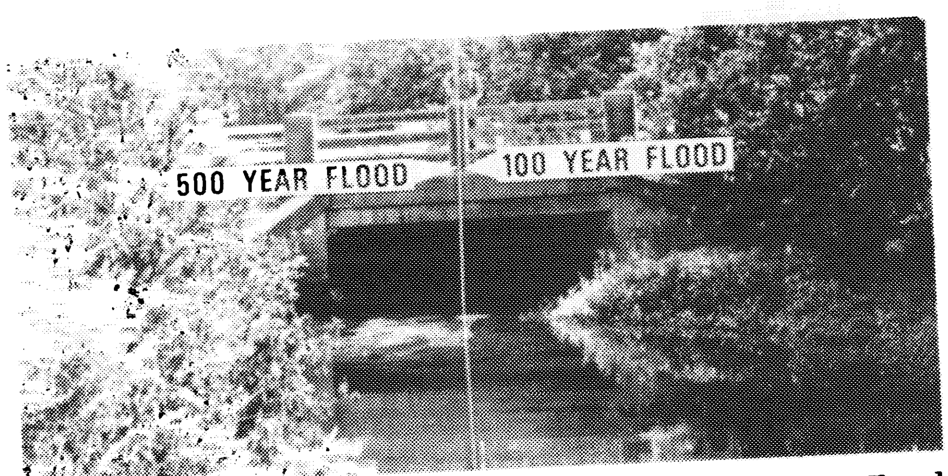


FIGURE 24 - Black Brook, Station 146+00. Future flood heights at Foundry Street.

FIGURE 25 - Black Brook, Station 45+00. Future flood heights at Turnpike Street (Rte. 138).

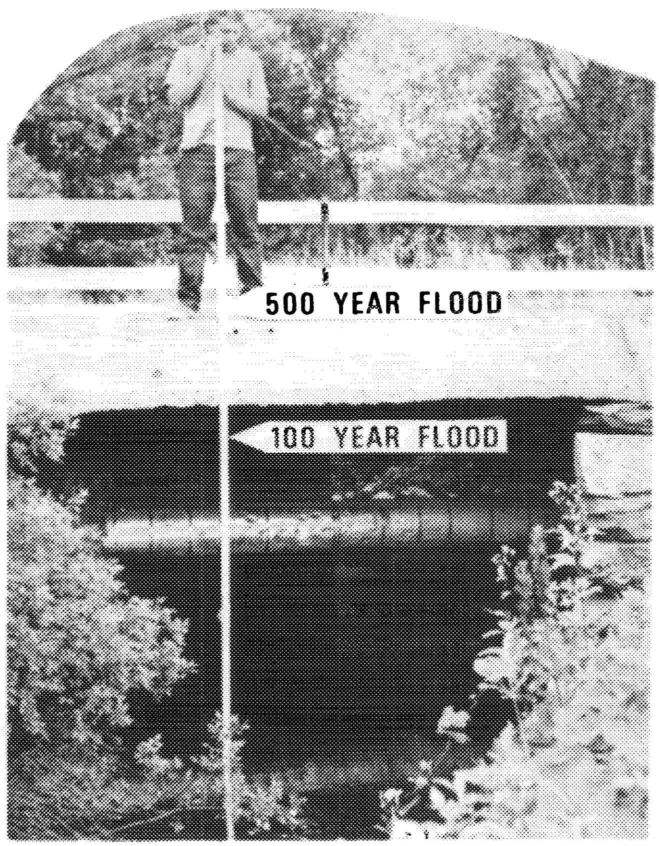


FIGURE 26 - Mulberry Brook, Station 95+00. Future flood heights at Highland Street.

GUIDELINES FOR FLOOD PLAIN MANAGEMENT

Man has been building on and occupying the flood plains of rivers and streams since the arrival of pioneer settlers. The streams first provided transportation and water supply and later their gentle valley grades encouraged the construction of highways and railroads. Today uncontrolled growth of cities often results in unwise encroachment on the flood plains of local streams.

Through bitter experience, man has learned that floods periodically inundate portions of the flood plain, damaging property and often causing loss of life. This experience has led to a relatively new approach for reducing flood damages. Called "flood plain management," this approach consists of applying controls over the use of land lying adjacent to streams. Planned development and management of flood hazard areas can be accomplished by a variety of means.

Interpretation of Data

Flooded area maps and profiles are provided in this report to define the limits of flooding that would occur during a 100-year flood and a 500-year flood. The actual limits of these overflow areas on the ground will vary from those shown because the scales of the available maps do not permit precise plotting of the flooded area boundaries. Important land use decisions in specific areas should be verified by field surveys. Changes in the land use, drainage patterns, and structural occupancy of the flood plain may result in higher flood elevations than those shown.

Hypothetical examples of the maps and profiles, shown on Figure 12 depict the areal limits and elevations of the respective floods at imaginary locations.

The lateral limits of flooding from the 100-year flood are shown by the light shaded area, while the darker area indicates the additional land that would be inundated by the 500-year flood. The line and numeral in the shaded area represent the elevation of the 100-year flood at that particular location. The flood profile shows the relative depth of floodwaters along the centerline of the stream.

By using information as illustrated on Page 60, together with other data such as frequency of occurrence, velocity of flow, and duration of

HYPOTHETICAL FLOOD PLAIN INFORMATION

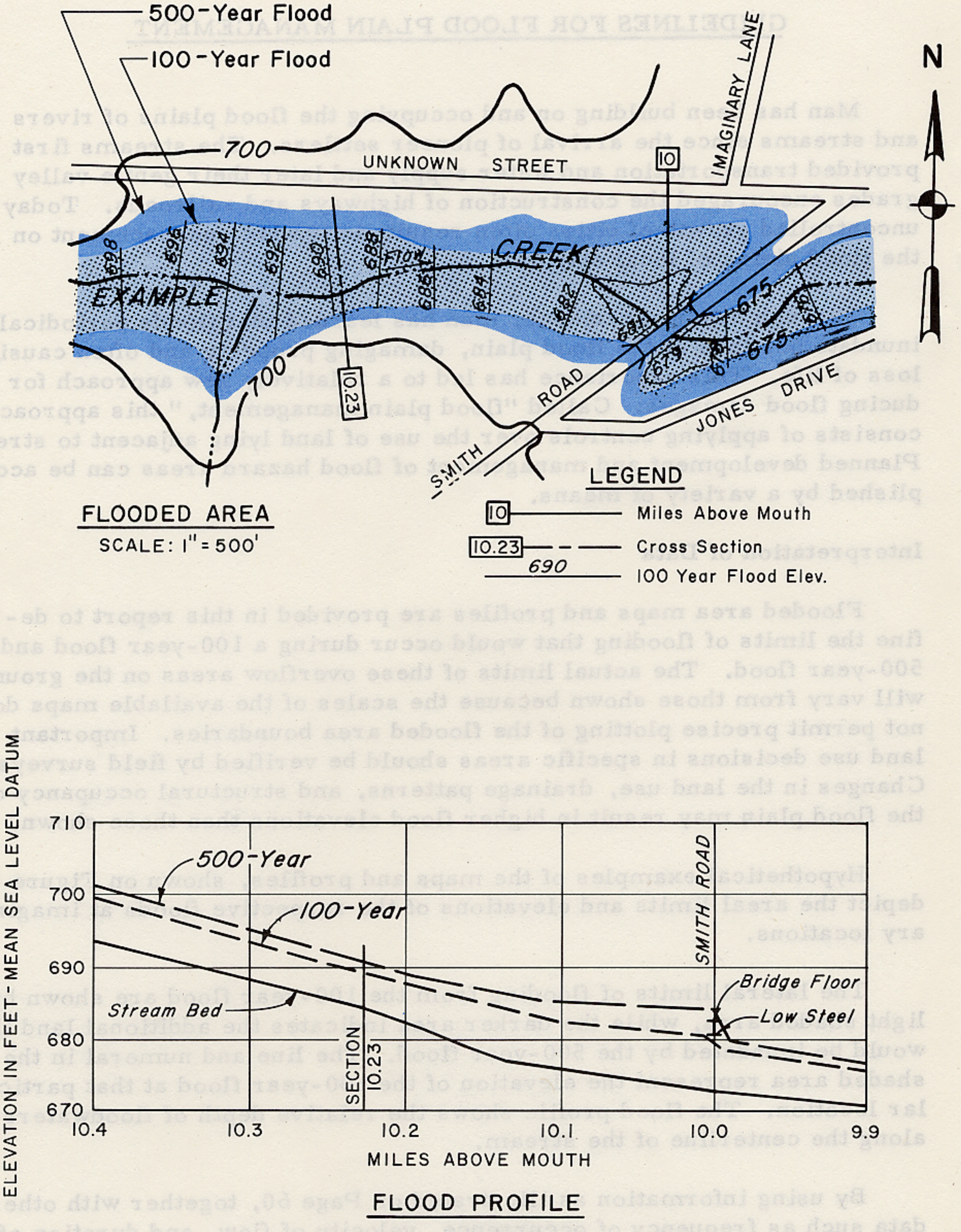


FIGURE 27

flooding, government entities and individuals can make knowledgeable decisions relative to the use, development, and management of areas subject to inundation.

Flood Plain Management Tools

The main purpose of this report is to provide guidance for intelligent land use in the river basin. This includes recognition of the existing flood hazards associated with streams in the area. Citizens of this and other watersheds have learned from bitter experience that the development of flood hazard areas should take place only with full knowledge of the risk and social cost involved. The following remarks concerning possible uses for the data presented herein are not intended to be all inclusive. They are meant to provide a cursory guide for utilizing the information on the flooding conditions in the river basin to the best advantage. The methods available for reducing flood losses can be subdivided into two general classifications, Regulatory and Nonregulatory.

Regulatory Measures

Regulation of flood plain land use can substantially contribute to the reduction of future flood damages and risk while contributing to other important objectives such as regional development and improvement or preservation of environmental attributes. (Of course, use here of the work "regulation" is not meant to imply nonuse of flood plain lands or any type of inequitable treatment of present or future land owners.)

Federal agencies do not have the authority to regulate flood plain development. This authority was assigned to the states (and their political subdivisions) in the tenth amendment to the U.S. Constitution and has never been delegated to the Federal Government. Consequently, local governmental bodies utilizing available state legislation have to assume the day to day responsibility for guiding development in flood prone areas.

The principal regulatory devices used at local governmental levels include zoning ordinances, subdivision regulations, and building and health codes. The following is a discussion of these four types of regulations.

a. Flood plain zoning ordinances are usually "super-imposed" on existing zoning ordinances. They may be used to implement broader land use plans and to reduce future flood losses by stipulating the type of building development permitted in flood prone areas. They can also be used to limit flood plain development by establishing flood plain encroachment limits. These regulations should exclude obstructions from flooding areas which adversely affect flood heights and allocate the flood plain to uses consistent with the degree of the flood threat. Floodways can be established along modified (enlarged, straightened) or natural stream channels. See the GLOSSARY OF TERMS for a definition of the terms "floodway" and "encroachment limits". The floodway and encroachment limit concepts are also illustrated on Figure 13.

b. Subdivision control ordinances may also be effective tools for flood plain building control. Subdivision control relates to the way in which land is divided and made ready for building development. For example, a city may control the subdivision of land within its jurisdiction by requiring that a large percentage of the minimum lot area of a subdivision be a designated height above an adopted floodwater elevation as a requisite for lot approval. Unlike zoning ordinances, which extend only to a city's limits, cities have some control over subdivision development in areas within their extraterritorial jurisdiction.

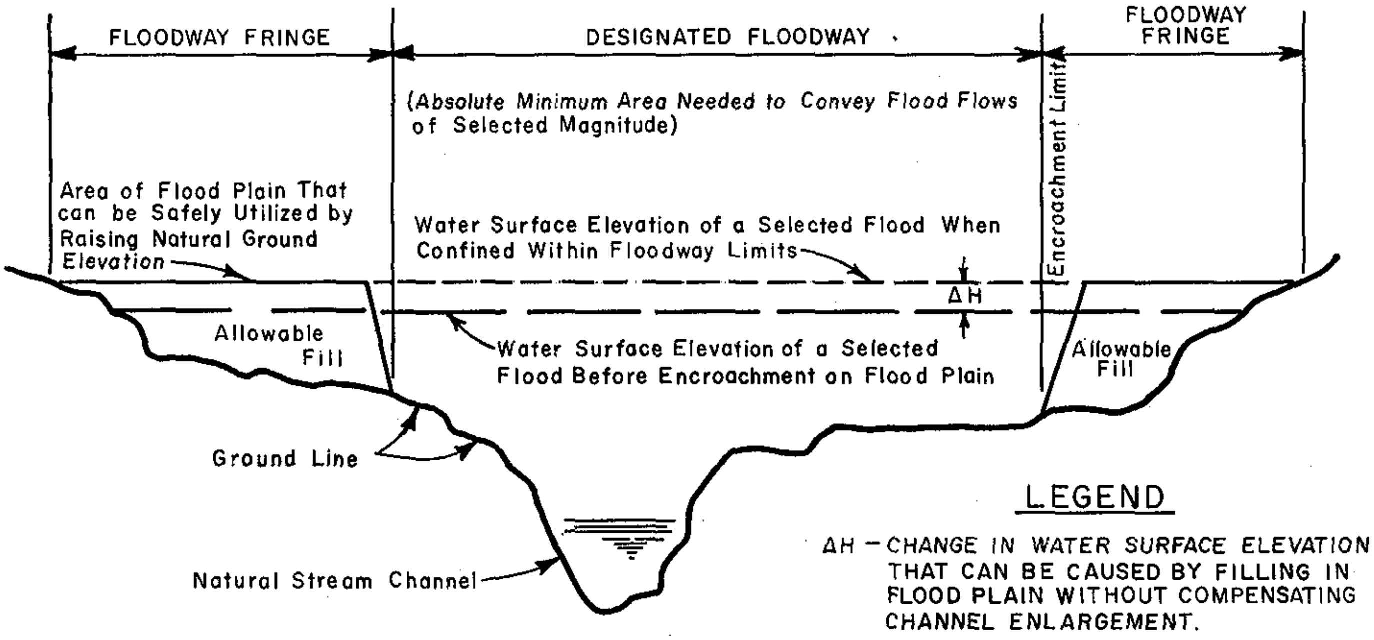
c. Building codes set forth standards of construction for the purposes of protecting health, safety, and general welfare of the public. Building codes may be written to set minimum standards for water (flood) proofing of structures, for establishing minimum first floor elevations consistent with potential flood occurrences, and requirements for material strength and proper anchorage.

d. Health codes can serve as a control over the use of flood plains for water disposal and the construction of water and sewage treatment facilities that may create health problems during floods.

Nonregulatory Measures

Other methods that can be used to reduce flood damage losses include:

a. Structural measures can be used to reduce flood heights (channel modifications, dams) or provide a barrier between floodwaters and development (levees, dikes).



FLOODWAY FRINGE

Suggested Uses

Uses permitted in the floodway area.
Residential, Commercial, Industrial, Public & other development with floodwater entry points at or above design elevation for encroachment.

Uses Not Appropriate

Hospitals & Nursing Homes
Boarding Schools & Orphanages
Sanitariums
Detention Facilities
Refuge Centers
Permanent Storage of Materials or Equipment (Emergency Equipment)

FLOODWAY AREA

Suggested Uses

Farms, Truck Gardens & Nurseries
Livestock & Other Agricultural Uses.
Non-obstructive Structures
Parking Lots, Playgrounds & Parks
Golf Course & Open Recreation
Preserves & Reservations.

Uses Not Appropriate

Land Fills & Obstructive Structures
Floatable Storage
Disposal of Garbage
Rubbish, Trash or Offal
All uses precluded from floodway fringe area.

FLOOD PLAIN CROSS SECTION
SHOWING FLOODWAY & ENCROACHMENT LIMIT CONCEPTS

FIGURE. 28

b. Fee purchase of lands for open space uses. Many grant and loan programs are available to local governments through the Department of Housing and Urban Development and other Federal agencies for preserving flood plain lands as green belts, development of these areas for parks, nature trails, etc.

c. Acquisition of flooding easements. Purchase of less than fee interest in flood prone land is another approach to controlling development.

d. Flood proofing by elevating structures, water proofing, or filling of low areas for building sites. Some buildings can be raised in place up to a reasonable limit to prevent flood damages. Other structures can be made to withstand flood velocities and depths through the use of bulkheads, watertight openings, flotation anchors, plumbing cutoff valves, and structural reinforcements. Structures can be built in flood plain fringe areas at elevations above a selected flood magnitude. However, this should be done only in connection with an established floodway width or encroachment limits to eliminate obstructions that would raise upstream flood stages.

e. Flood insurance can now be made available through the Department of Housing and Urban Development to communities that adopt appropriate flood plain regulations. Flood insurance does not reduce flooding or flooding caused damages, but reduces the risk of large economic losses by individual flood victims.

f. Development policies in regard to extending public services. "Flood conscious" governmental policies that limit or discourage the extension of public roads, utilities and other services into flood prone areas can play an important role in encouraging prudent flood plain use. Private developments usually depend on the extension of public services. By avoiding the extension of such services into flood hazard areas, local government and private utility companies can encourage the occupancy of safer, and in the long run, cheaper flood free areas.

Very little building is carried on without outside financing. Therefore, lending institutions, both Federal and private, are in a position to exercise control over flood plain development by denying mortgage guarantees or funds to subdivision or individual builders for projects that will eventually become "flood problems."

GLOSSARY

BACKWATER - The resulting high water surface in a given stream due to a downstream obstruction or high stages in an intersecting stream.

FLOOD - An overflow of water onto lands not normally covered by water and that are used or useable by man. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river or stream or lake or other body of standing water.

Normally, a "flood" is considered as any temporary rise in streamflow or stage, but not the ponding of surface water that results in significant adverse effects in the vicinity. Adverse effects may include damages from overflow of land areas, temporary backwater effects in sewers and local drainage channels, creation of unsanitary conditions or other unfavorable situations by deposition of materials in stream channels during flood recessions, rise of ground water coincident with increased streamflow, and other problems.

FLOOD CREST - The maximum stage or elevation reached by the waters of a flood at a given location.

FLOOD HYDROGRAPH - A graph showing the stage in feet against time at a given point and the rate of rise and duration above flood stage.

FLOOD PLAIN - The areas adjoining a river, stream, watercourse, ocean, lake, or other body of standing water which has been or may be covered by floodwater.

FLOOD PROFILE - A graph showing the relationship of water surface elevation to location, the latter generally expressed as distance above mouth for a stream of water flowing in an open channel. It is generally drawn to show surface elevation for the crest of a specific flood but may be prepared for conditions at a given time or stage.

FLOOD STAGE - The stage or elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.

HURRICANE - An intense cyclonic windstorm of tropical origin in which winds tend to spiral inward in a counterclockwise direction toward a core of low pressure with maximum surface wind velocities that equal or exceed 75 miles per hour (65 knots) for several minutes or longer at some points. Tropical storm is the term applied if maximum winds are less than 75 miles per hour.

INTERMEDIATE REGIONAL FLOOD - A flood having an average frequency of occurrence in the order of once in 100 years although the flood may occur in any year. It is based on statistical analyses of streamflow records available for the watershed and analyses of rainfall and runoff characteristics in the "general region of the watershed."

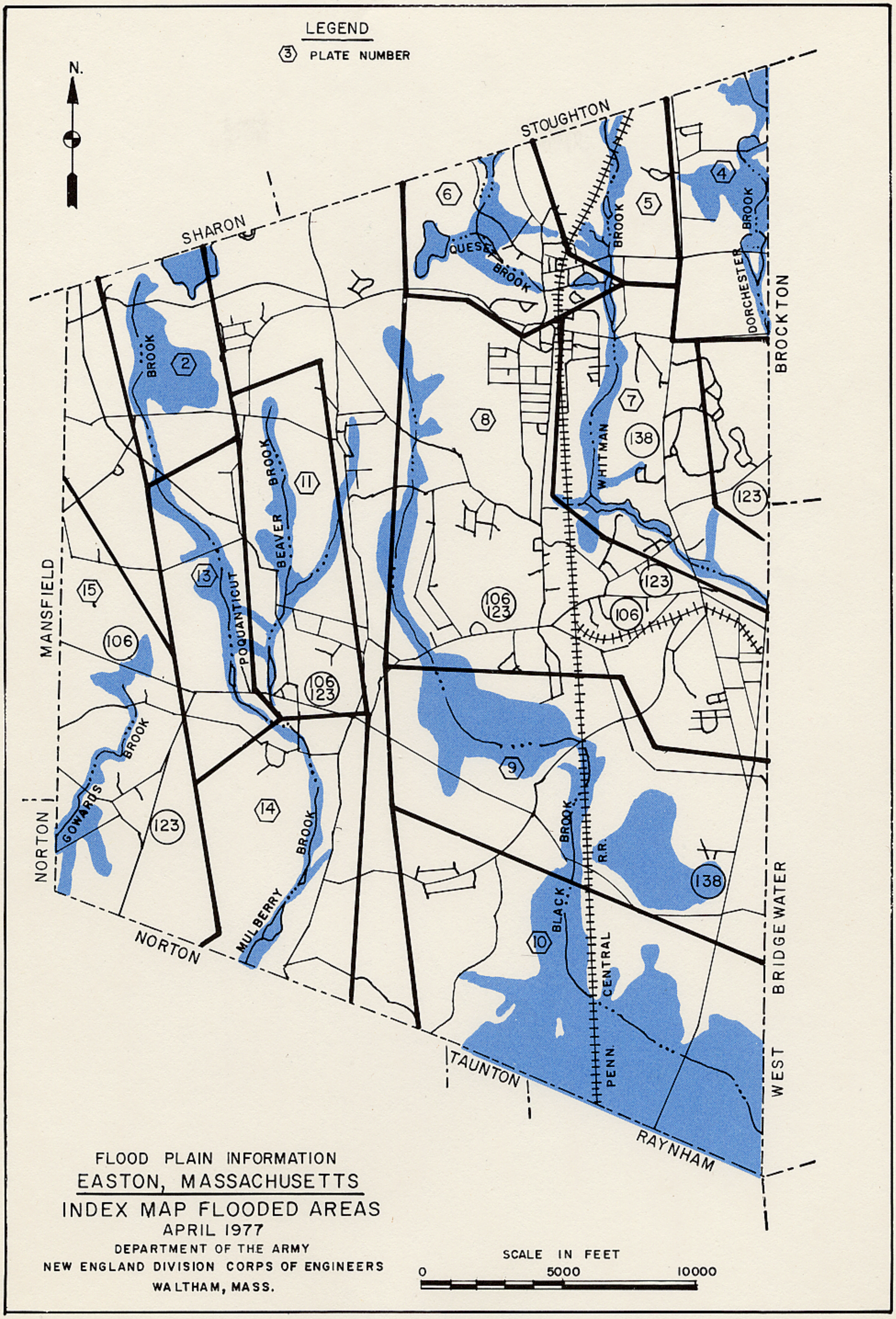
LEFT BANK - The bank of the left side of a river, stream, or watercourse looking downstream.

PROBABLE MAXIMUM FLOOD - A hypothetical flood representing the most severe flood with respect to volume, concentration of runoff, and peak discharge that may be expected from a combination of the most severe meteorological and hydrological conditions in the region.

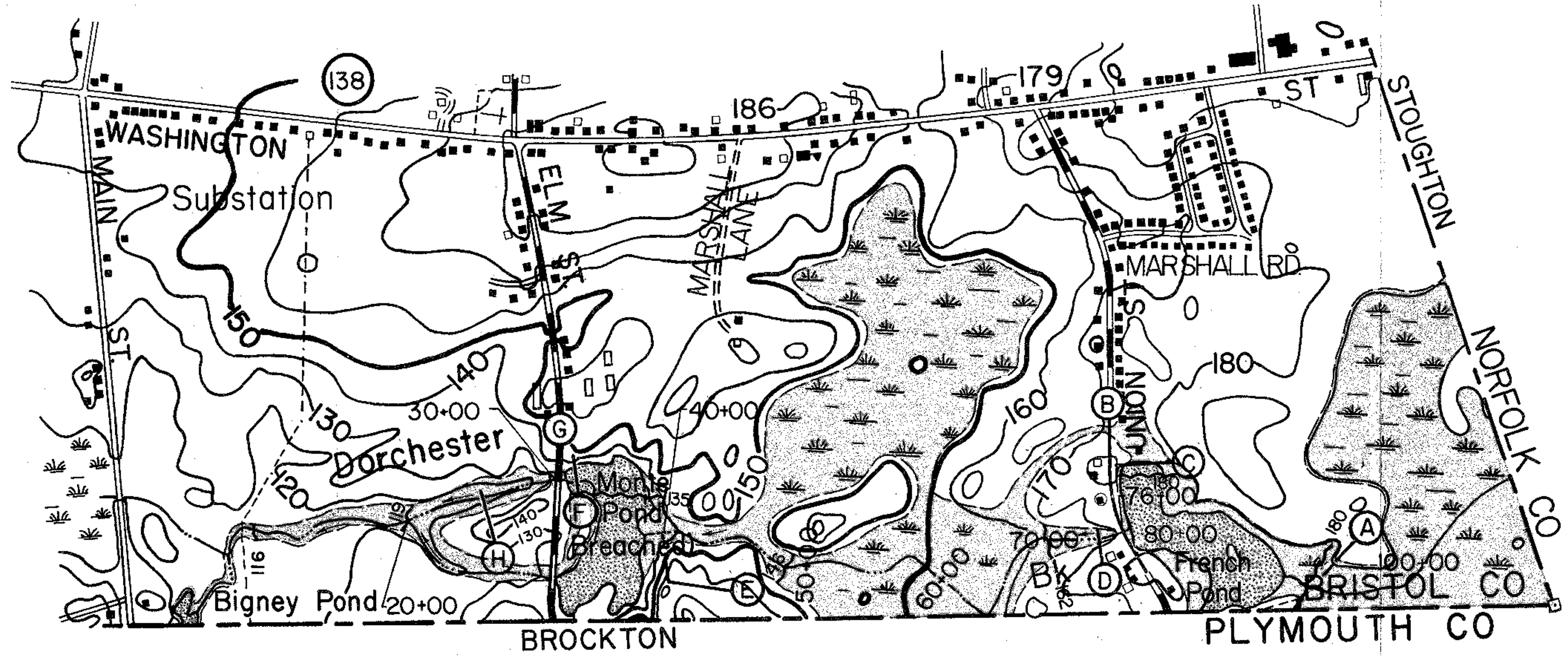
RIGHT BANK - The bank on the right side of a river, stream, or watercourse looking downstream.

STANDARD PROJECT FLOOD - The flood that may be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations. Peak discharges for these floods are generally about 40 percent to 60 percent of the Probable Maximum Floods for the same basins. Such floods, as used by the Corps of Engineers, are intended as practicable expressions of the degree of protection that should be sought in the design of flood control works, the failure of which might be disastrous.

UNDERCLEARANCE ELEVATION - The elevation at the top of the opening of a culvert or other structure through which water may flow along a watercourse. This is referred to as "low steel" in some regions.



FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS
INDEX MAP FLOODED AREAS
APRIL 1977
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION CORPS OF ENGINEERS
WALTHAM, MASS.



LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD
500 YEAR FLOOD

20+00 PROFILE STATION IN FEET ABOVE TOWN LINE.

180 100 YEAR FLOOD ELEVATION

150 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

(A) STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEET FOR BROCKTON, MASS. 1963. MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. **SEE PAGE NO. 29**
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

0 1000 2000

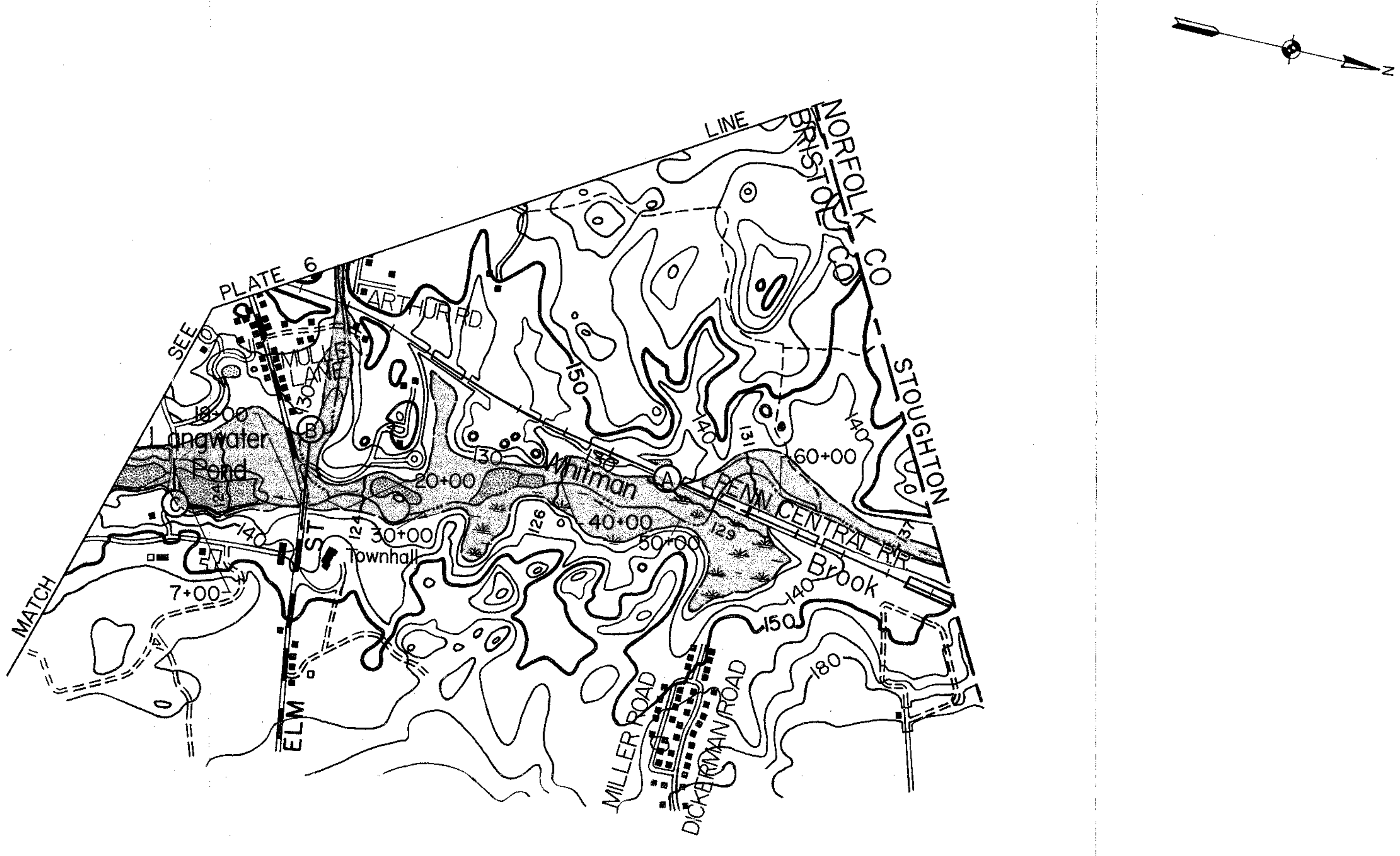
FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS
DORCHESTER BROOK
FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

Where the overflow limit for the 100 Year Flood only is shown, the overflow limit for the 500 Year Flood is approximately the same.

PLATE 4



LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD

40+00 PROFILE STATION IN FEET ABOVE CONFLUENCE WITH QUESET BROOK

131 100 YEAR FLOOD ELEVATION

150 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

(A) STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEET BROCKTON, MASS. 1963. MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO. 29
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

0 1000 2000

FLOOD PLAIN INFORMATION

EASTON, MASSACHUSETTS

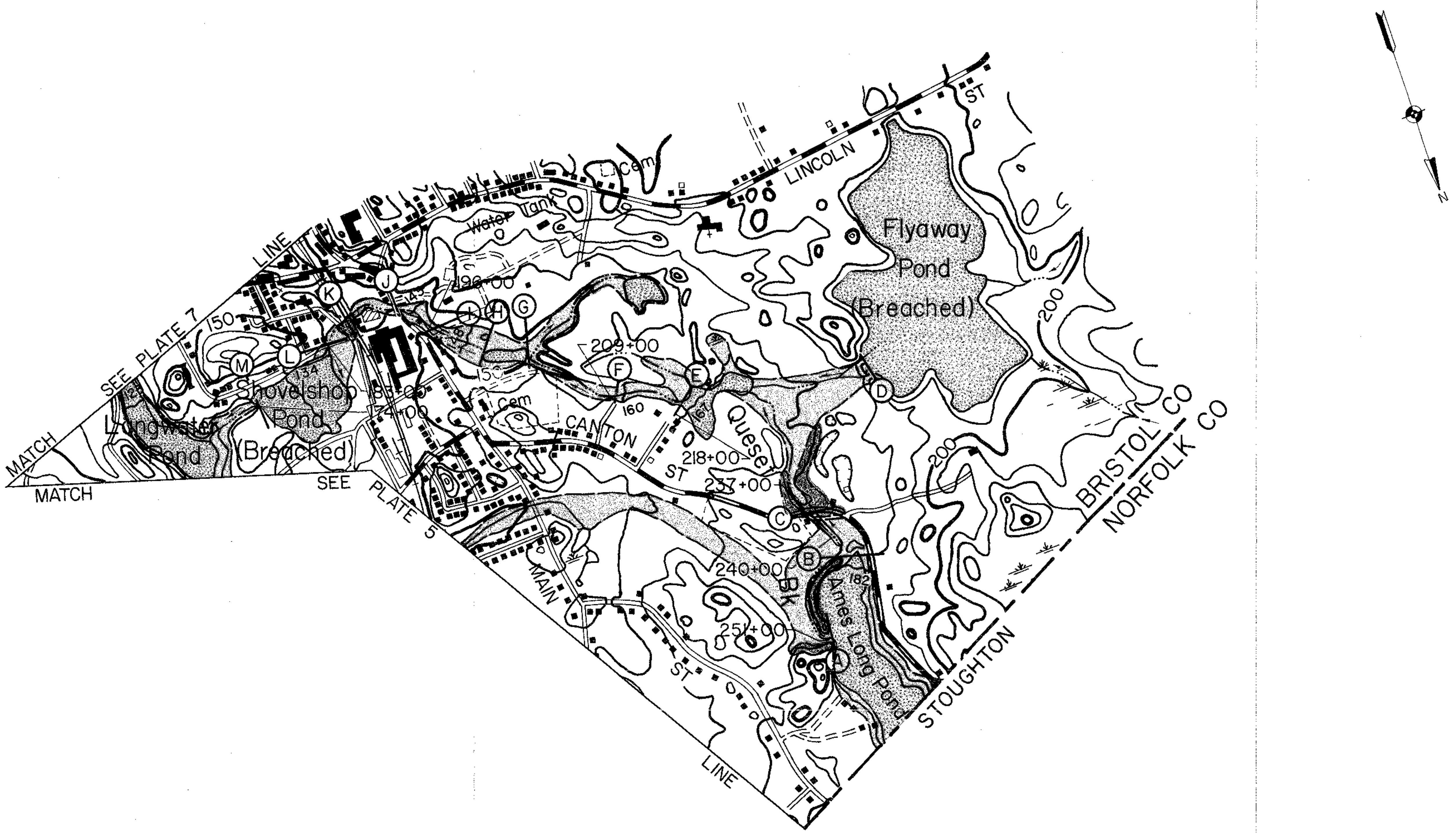
WHITMAN BROOK

FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.



Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.

LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD — 500 YEAR FLOOD

240+00 — PROFILE STATION IN FEET ABOVE TOWN LINE

160 — 100 YEAR FLOOD ELEVATION

200 — GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

(A) — STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEETS FOR BROCKTON, MASS. 1963 AND MANSFIELD, MASS. 1964. MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO. 29
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

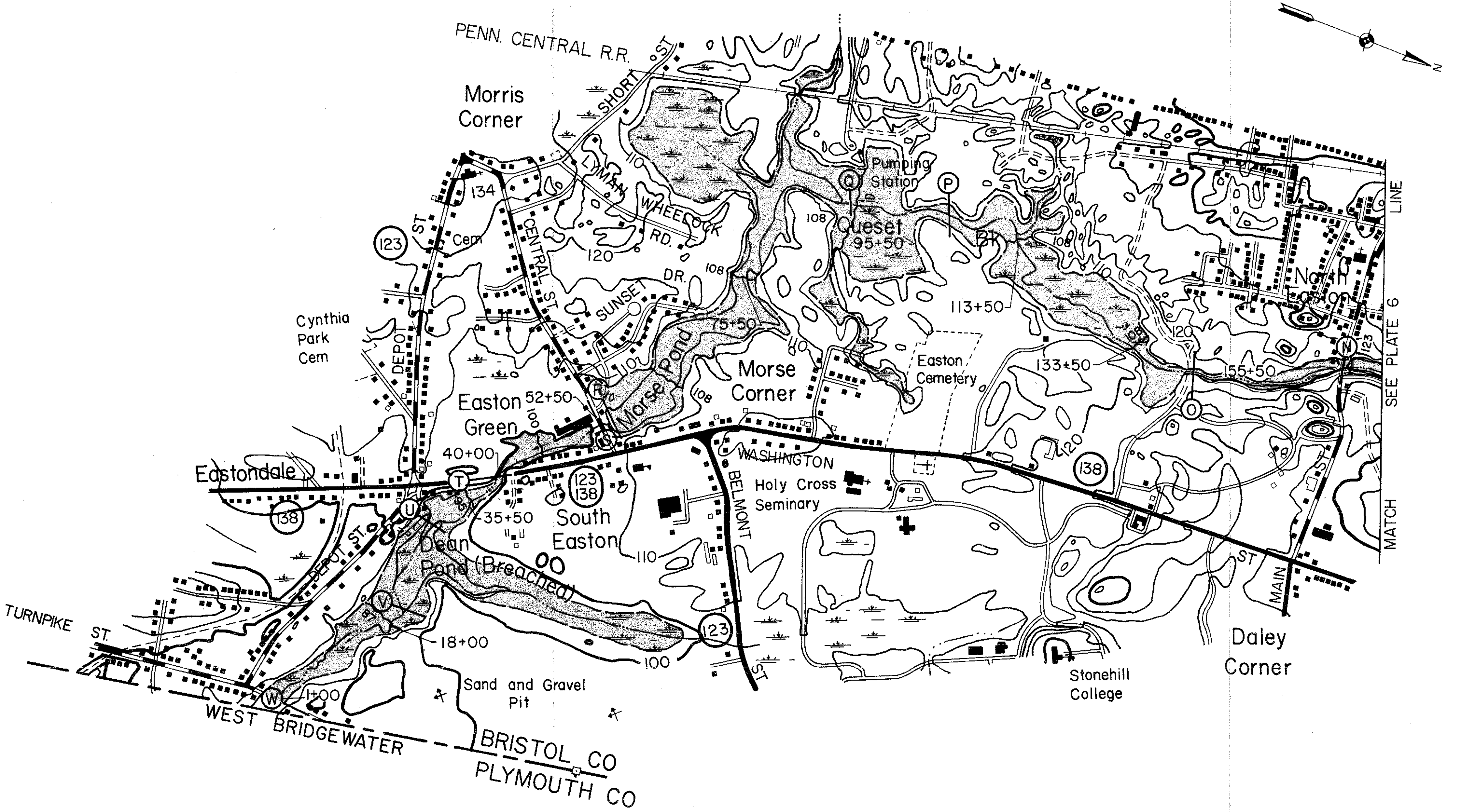
SCALE IN FEET

0 1000 2000

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS
QUESET BROOK
FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.

LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD

1+00 — PROFILE STATION IN FEET ABOVE TOWN LINE

100 — 100 YEAR FLOOD ELEVATION

120 — GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

(V) — STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEET FOR BROCKTON, MASS. 1963 MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO. 29
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

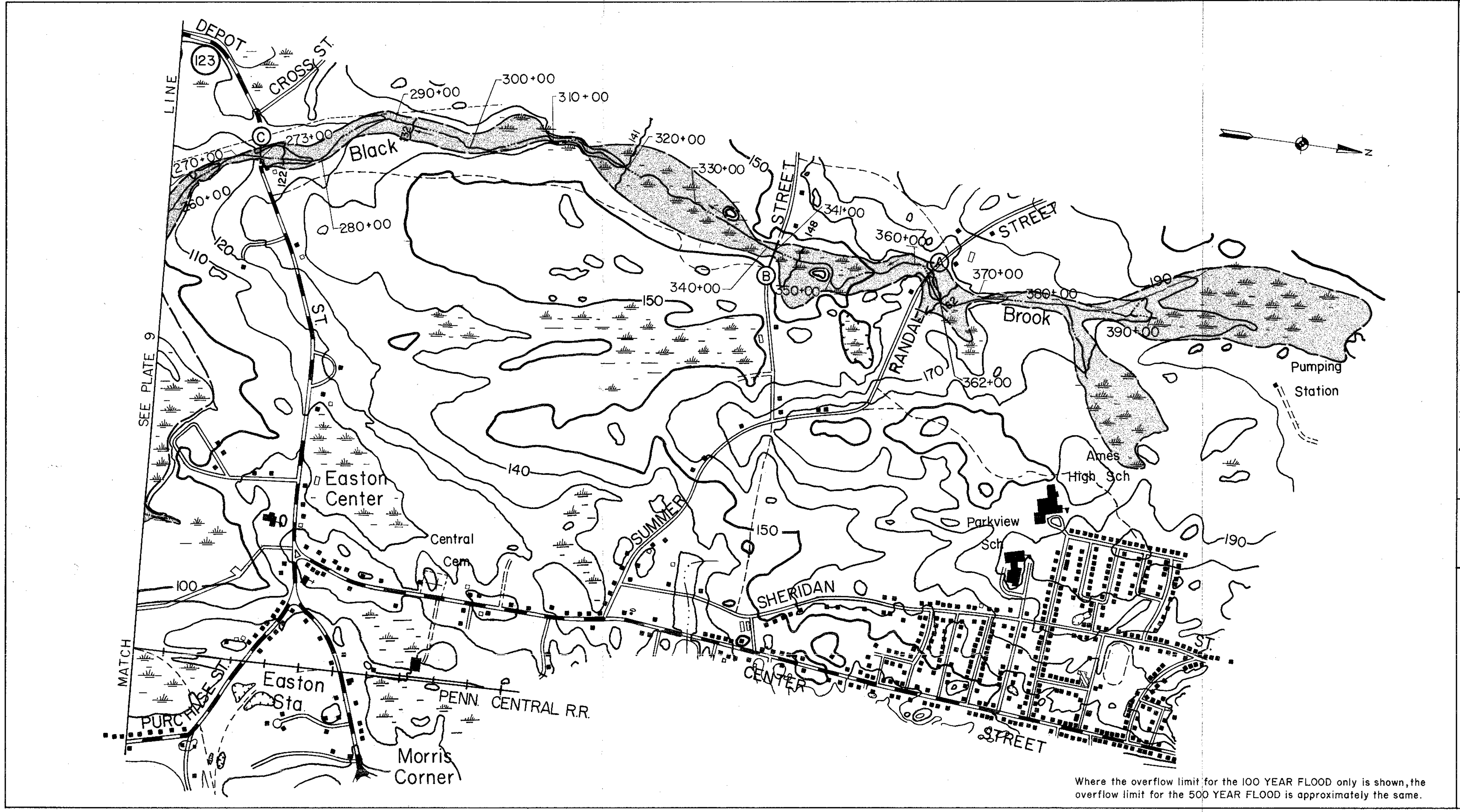
SCALE IN FEET

0 1000 2000

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS
QUESET BROOK
FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.

LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD

380+00 PROFILE STATION IN FEET ABOVE TOWN LINE

148 100 YEAR FLOOD ELEVATION

150 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

(A) STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEET FOR BROCKTON, MASS. 1963 MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO. 29
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

0 1000 2000

FLOOD PLAIN INFORMATION

BLACK BROOK

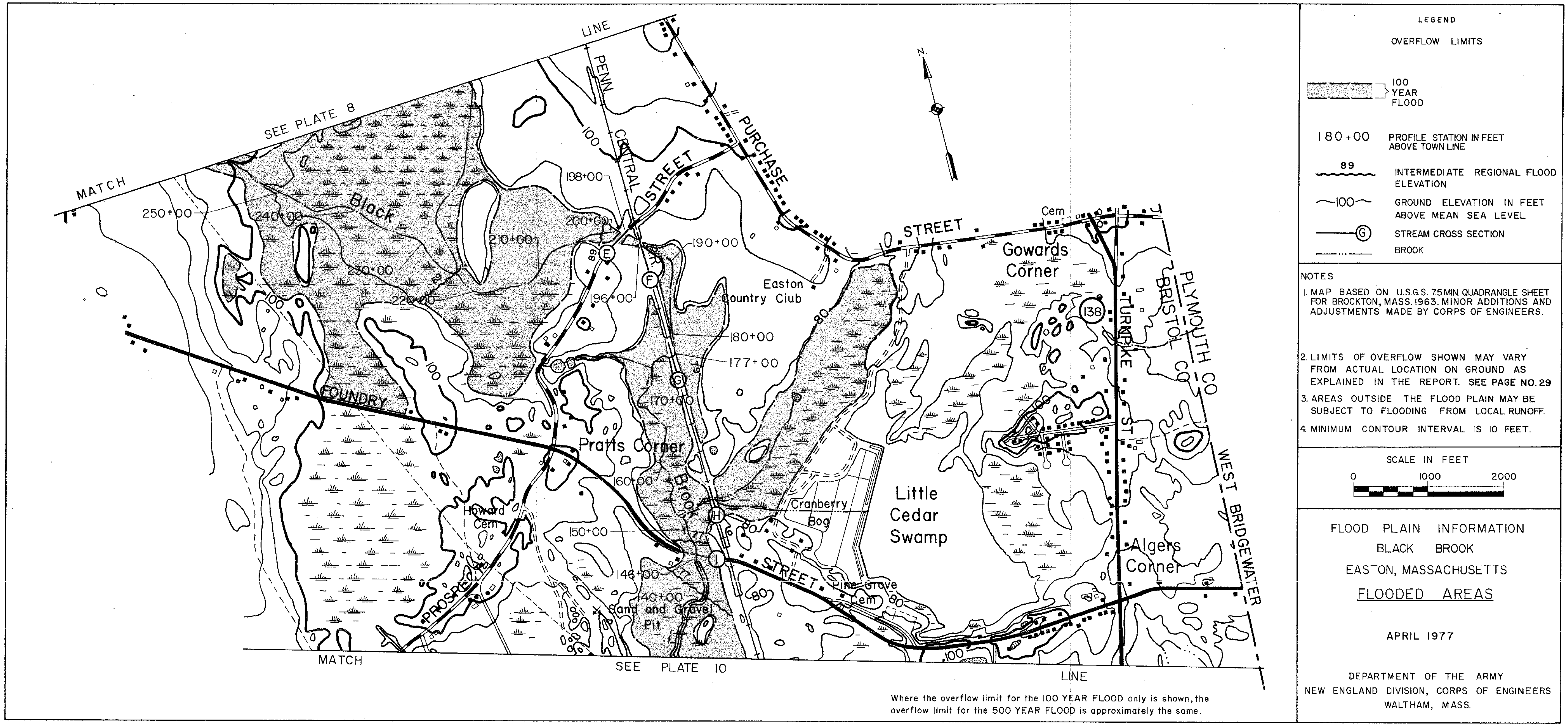
EASTON, MASSACHUSETTS

FLOODED AREAS

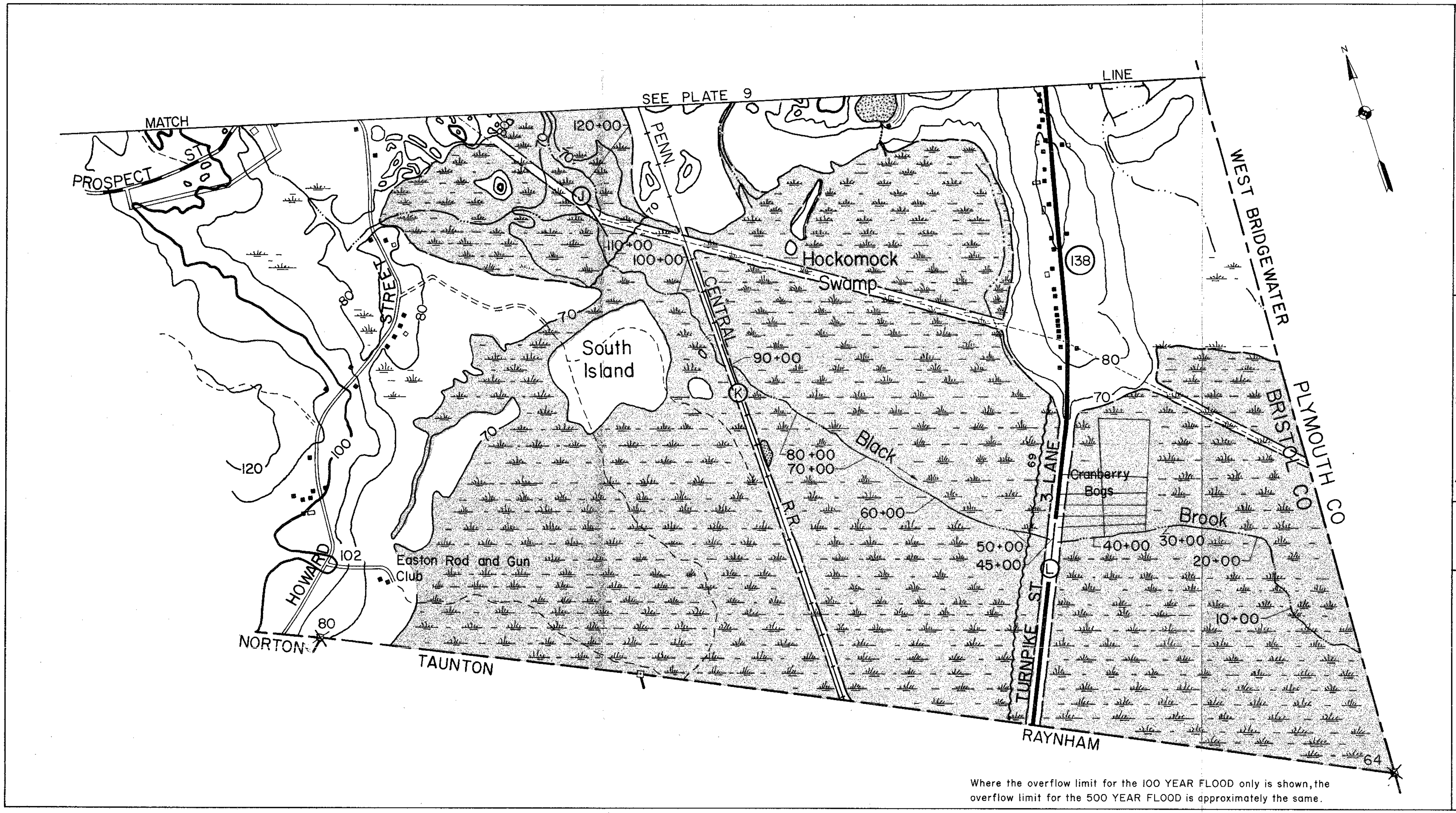
APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

PLATE 8



LEGEND
OVERFLOW LIMITS
100 YEAR FLOOD
180+00 PROFILE STATION IN FEET ABOVE TOWN LINE
89 INTERMEDIATE REGIONAL FLOOD ELEVATION
100 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL
G STREAM CROSS SECTION
BROOK
NOTES
1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEET FOR BROCKTON, MASS. 1963. MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO. 29
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.
SCALE IN FEET
0 1000 2000
FLOOD PLAIN INFORMATION
BLACK BROOK
EASTON, MASSACHUSETTS
FLOODED AREAS
APRIL 1977
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.
MATCH LINE SEE PLATE 8
MATCH LINE SEE PLATE 10
Black Brook
PENN
CENTRAL STREET
PURCHASE STREET
FOUNDRY STREET
PROSPECT
TURNPIKE ST
138
PLYMOUTH CO
BRISTOL CO
WEST BRIDGEWATER
Easton Country Club
Pratts Corner
Gowards Corner
Algers Corner
Little Cedar Swamp
Cranberry Bog
Howard Cem
Pine Grove Cem
Cem
Sand and Gravel Pit
N.
250+00
240+00
230+00
220+00
210+00
200+00
198+00
196+00
190+00
180+00
177+00
170+00
160+00
150+00
146+00
140+00
E
F
G
H
I
100
89
80
77
Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.



LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD

50+00 PROFILE STATION IN FEET ABOVE TOWN LINE

69 INTERMEDIATE REGIONAL FLOOD ELEVATION

100 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

L STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEETS BROCKTON, MASS. 1963 AND TAUNTON, MASS. 1962. MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO. 29
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

0 1000 2000

FLOOD PLAIN INFORMATION

BLACK BROOK

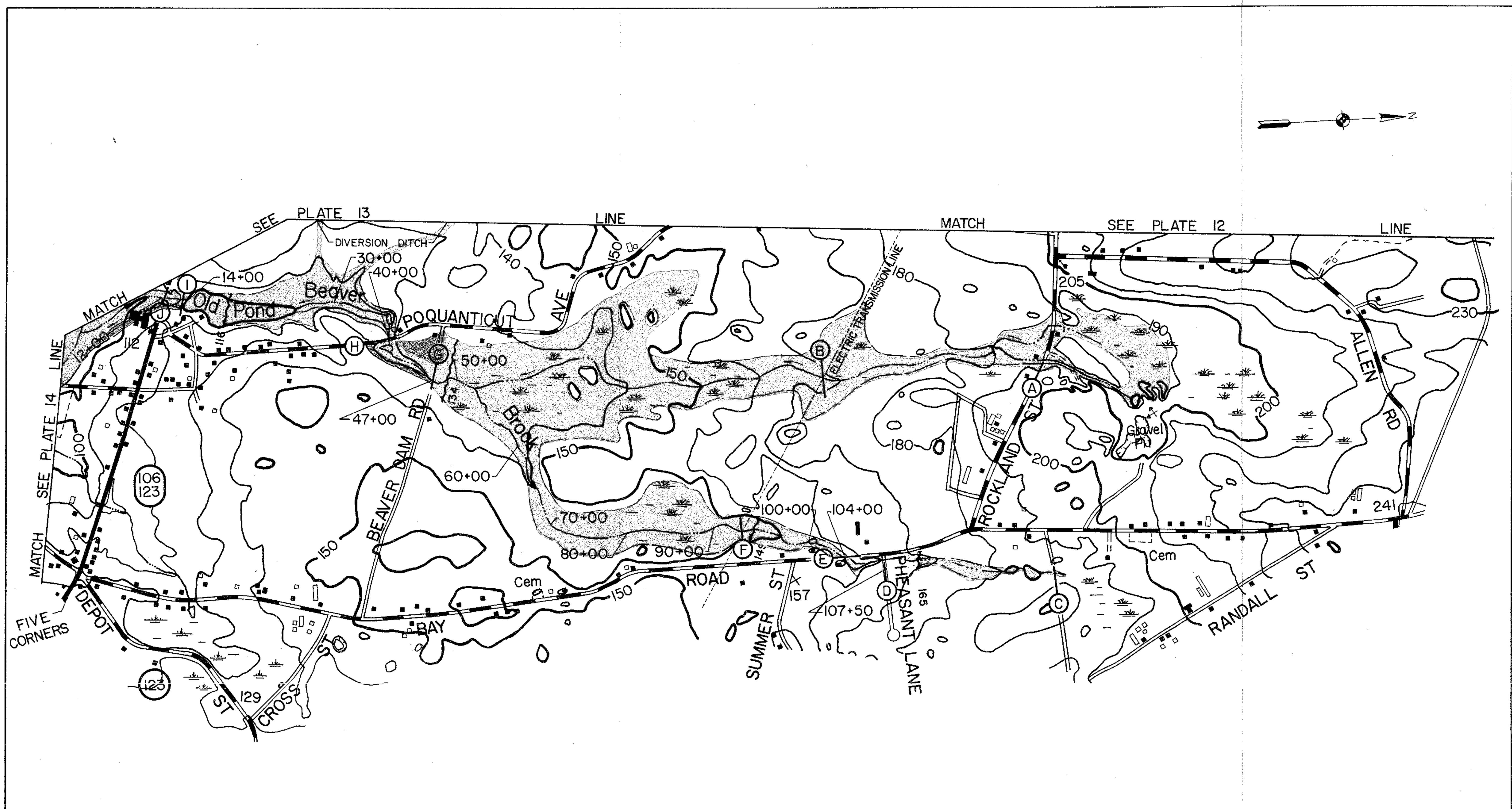
EASTON, MASSACHUSETTS

FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

PLATE 10



Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.

LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD — 500 YEAR FLOOD

47+00 — PROFILE STATION IN FEET ABOVE CONFLUENCE WITH BEAVER BROOK

179 — INTERMEDIATE REGIONAL FLOOD ELEVATION

200 — GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

(A) — STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEETS, FOR BROCKTON, MASS. 1963 AND MANSFIELD, MASS. 1964. MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO. 29
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

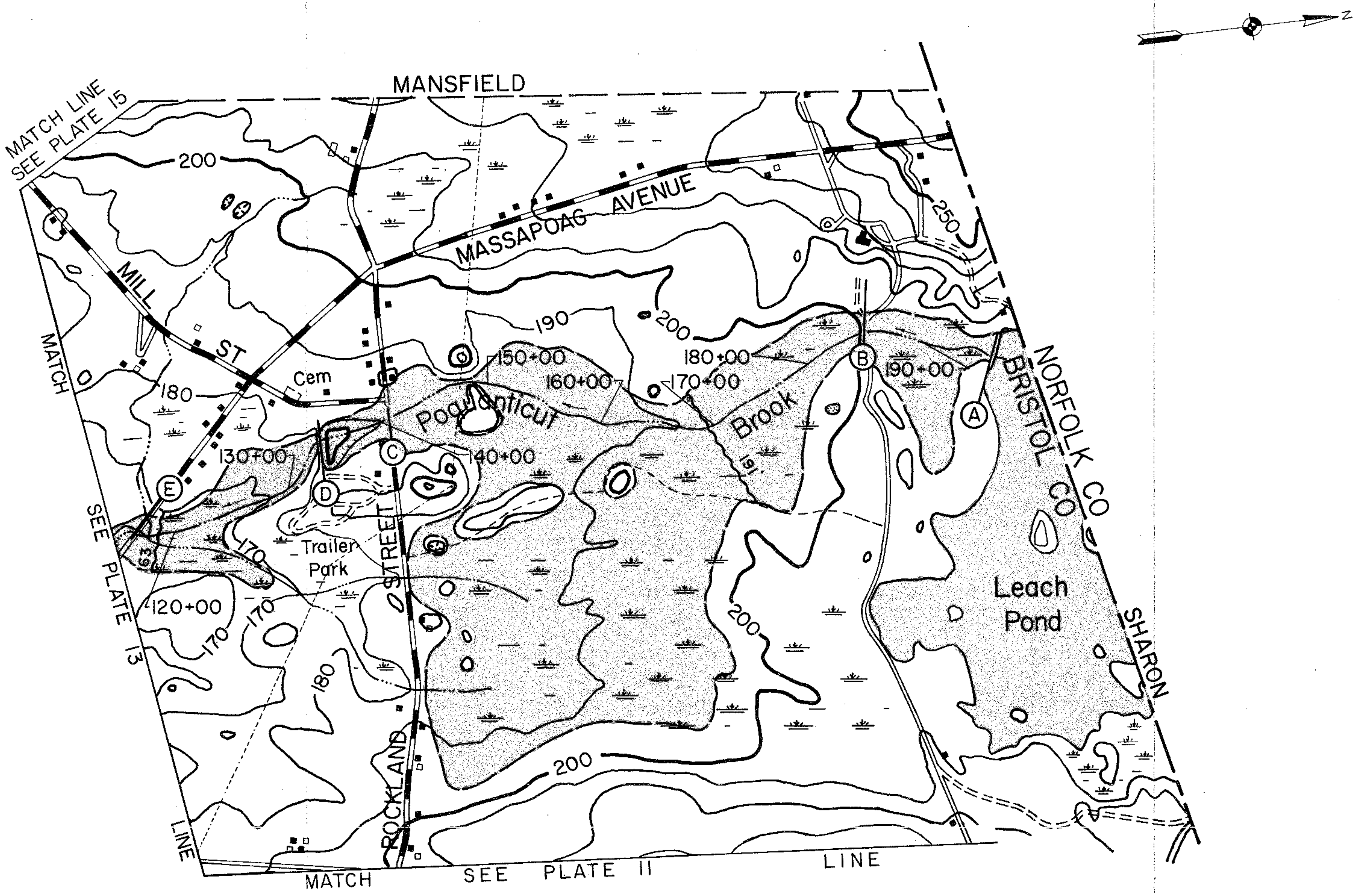
0 1000 2000

FLOOD PLAIN INFORMATION
BEAVER BROOK
EASTON, MASSACHUSETTS

FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.

LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD

180+00 PROFILE STATION IN FEET ABOVE CONFLUENCE WITH BEAVER BROOK

163 100 YEAR FLOOD ELEVATION

200 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

(A) STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEET FOR MANSFIELD, MASS. 1964. MINOR ADDITIONS AND AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.

2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO.29

3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.

4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

0 1000 2000

FLOOD PLAIN INFORMATION

POQUANTICUT BROOK

EASTON, MASSACHUSETTS

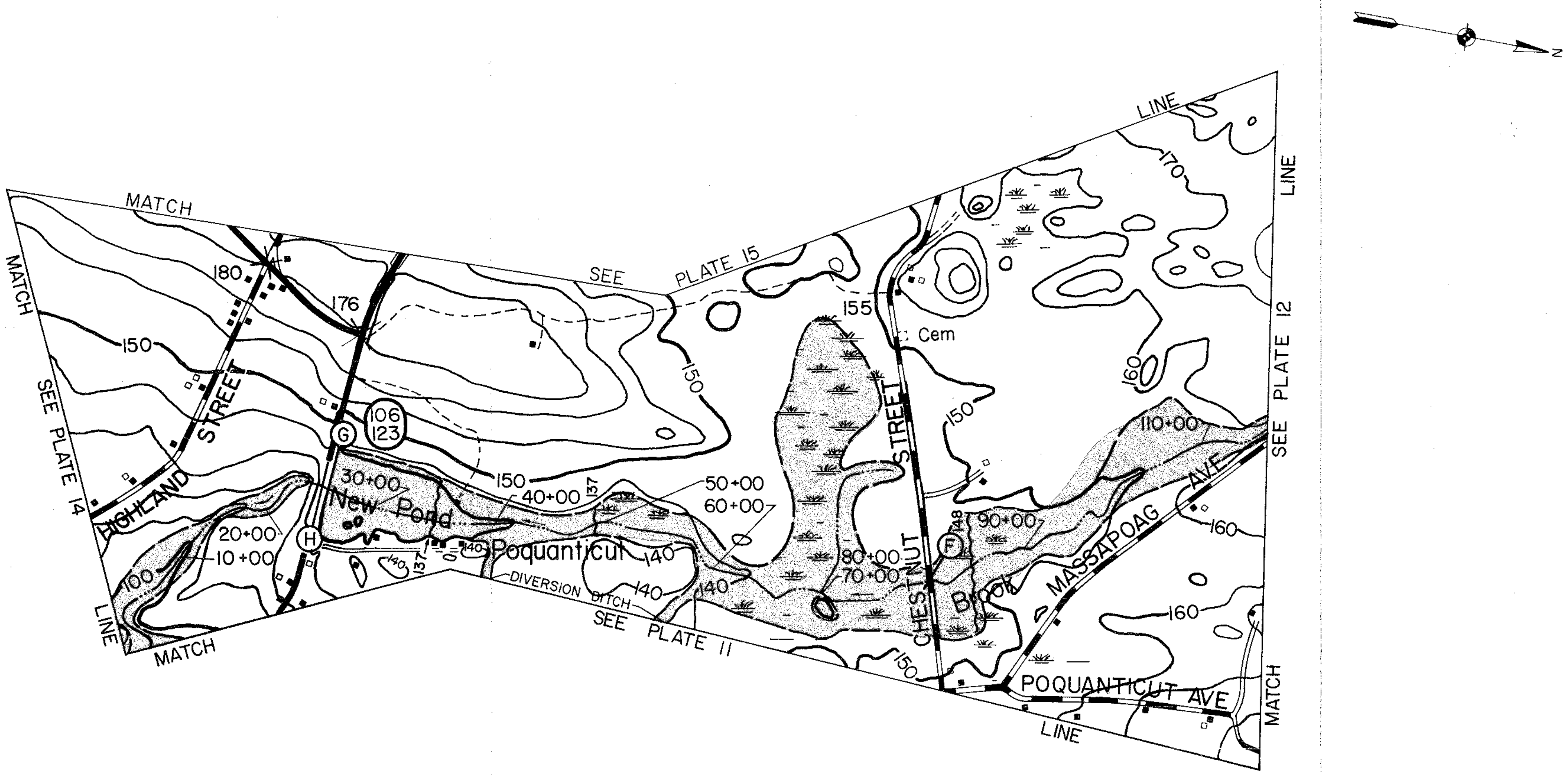
FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MASS.



LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD

90+00 PROFILE STATION IN FEET ABOVE CONFLUENCE WITH BEAVER BROOK

148 100 YEAR FLOOD ELEVATION

150 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

F STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEETS FOR MANSFIELD, MASS. 1964. MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.

2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO. 29

3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.

4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

0 1000 2000

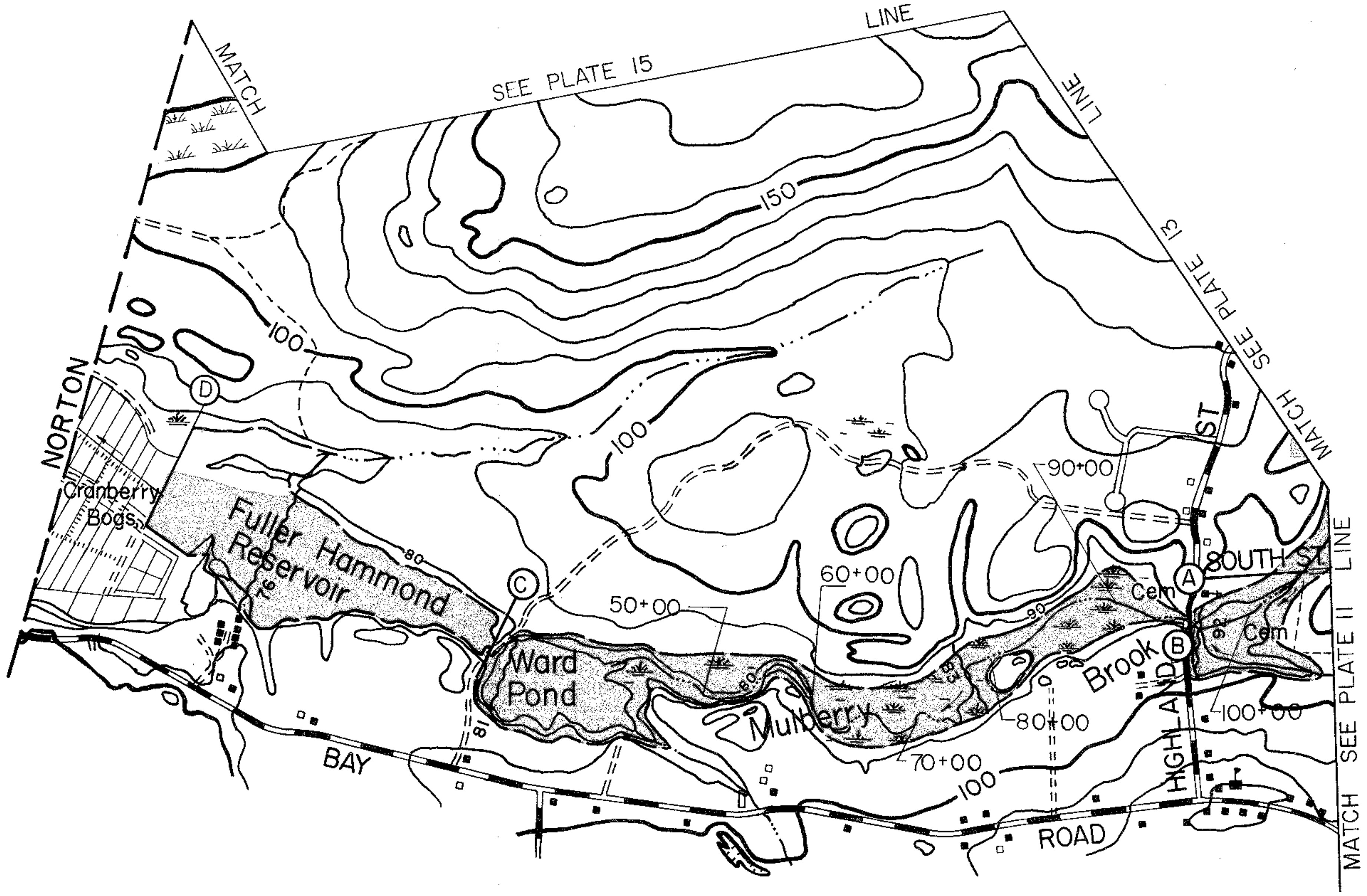
FLOOD PLAIN INFORMATION
POQUANTICUT BROOK
EASTON, MASSACHUSETTS

FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.



LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD

50+00 — PROFILE STATION IN FEET ABOVE TOWN LINE

77 — INTERMEDIATE REGIONAL FLOOD ELEVATION

100 — GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

(A) — STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEETS BROCKTON 1963, MANSFIELD 1964, NORTON 1964, AND TAUNTON 1962. MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. **SEE PAGE NO.29**
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

0 1000 2000

FLOOD PLAIN INFORMATION

MULBERRY BROOK

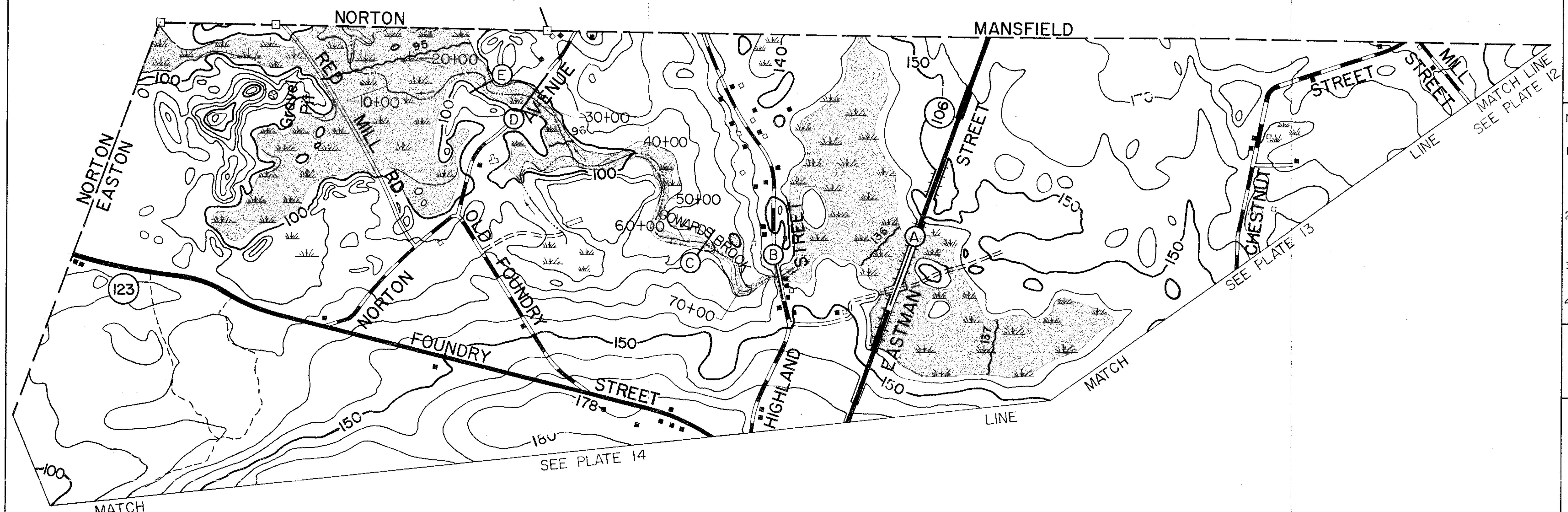
EASTON, MASSACHUSETTS

FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.



LEGEND

OVERFLOW LIMITS

100 YEAR FLOOD

20+00 STATION IN FEET ABOVE TOWN LINE

96 100 YEAR FLOOD ELEVATION

150 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

(A) STREAM CROSS SECTION

BROOK

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEETS FOR MANSFIELD, MASS. 1964 AND NORTON, MASS. 1964. MINOR ADDITIONS AND ADJUSTMENTS MADE BY CORPS OF ENGINEERS.
2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT. SEE PAGE NO. 29
3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. MINIMUM CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

0 1000 2000

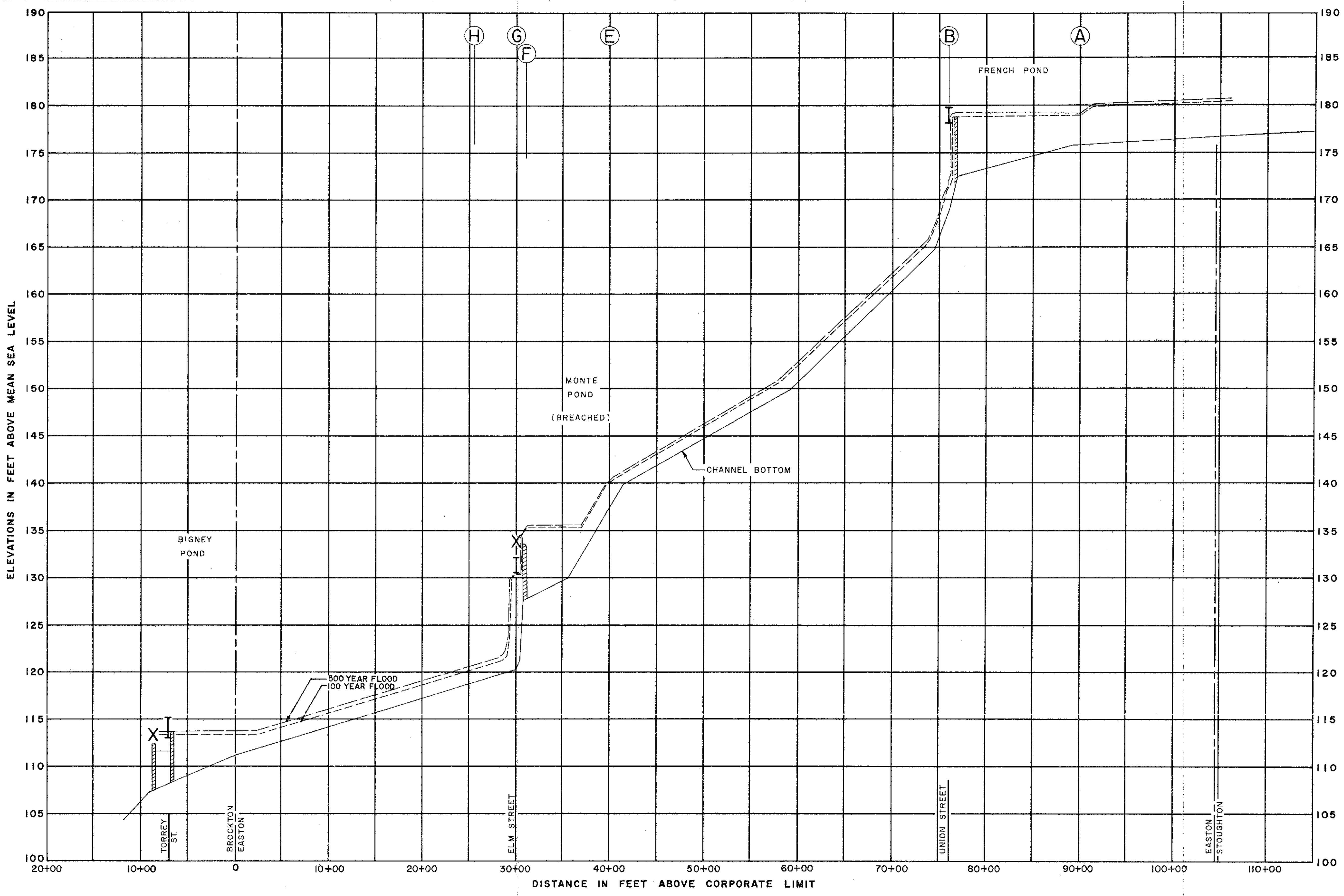
Where the overflow limit for the 100 YEAR FLOOD only is shown, the overflow limit for the 500 YEAR FLOOD is approximately the same.

FLOOD PLAIN INFORMATION
GOWARDS BROOK
EASTON, MASSACHUSETTS
FLOODED AREAS

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

PLATE 15



LEGEND

I BRIDGE OR CULVERT

DAM

(A) STREAM CROSS SECTION

X HIGH WATER (MARCH 1968)

NOTES:

1. FOR PLAN, SEE PLATE 4
2. ELEVATIONS FOR THE MARCH, 1968 FLOOD WERE OBTAINED FROM INTERVIEWS WITH RESIDENTS. OBSERVED ELEVATIONS ARE HIGHER THAN CALCULATED ELEVATIONS FOR 100 YEAR AND 500 YEAR FLOODS BECAUSE OF DAM FAILURE RATHER THAN HYDROLOGICAL CONDITIONS.
3. MONTE POND DAM BREACHED IN 1974.

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS

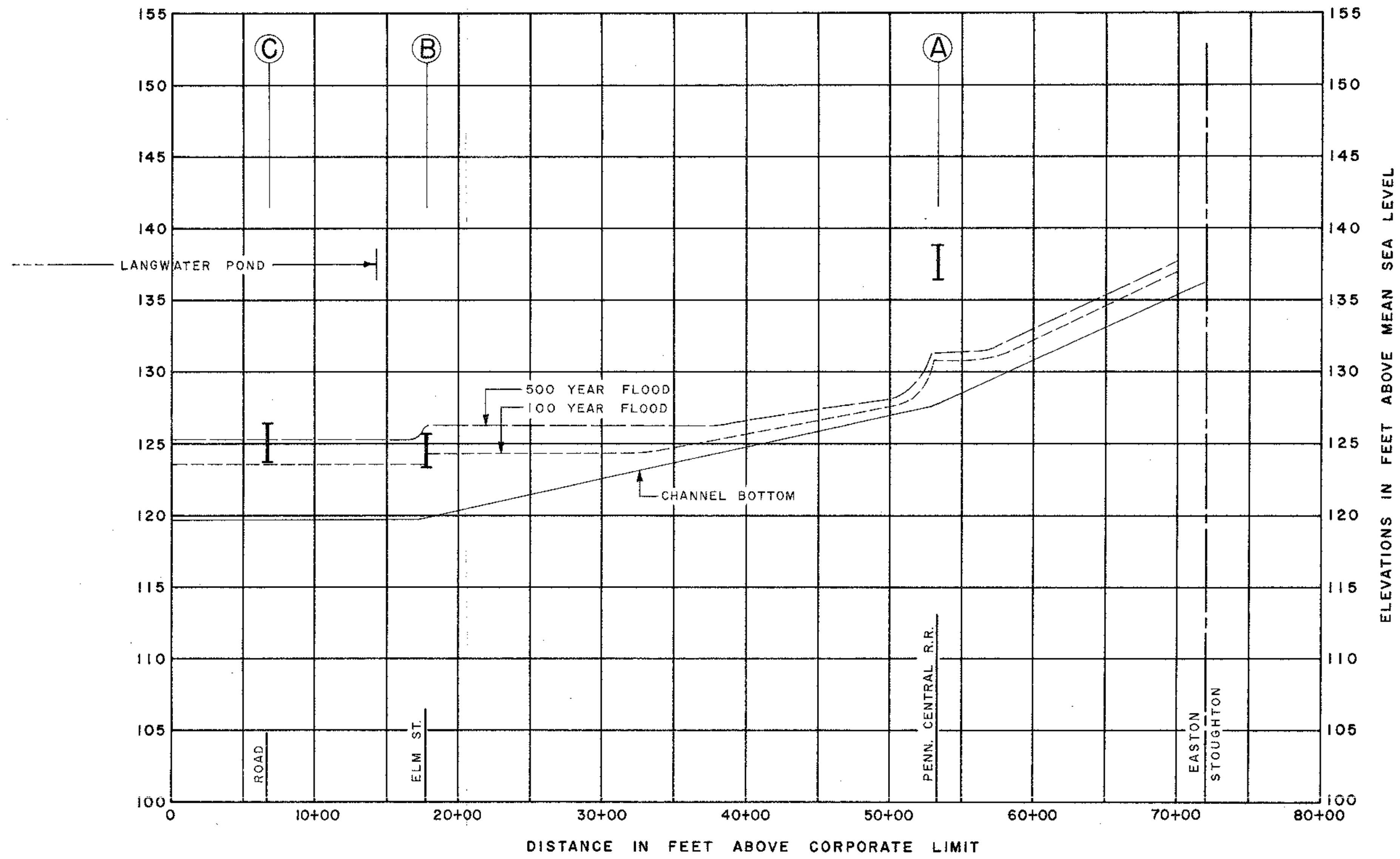
DORCHESTER BROOK

HIGH WATER PROFILES

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

PLATE 16



LEGEND

I BRIDGE OR CULVERT

Ⓐ STREAM CROSS SECTION

NOTE

1. FOR PLAN, SEE PLATE 5

FLOOD PLAIN INFORMATION

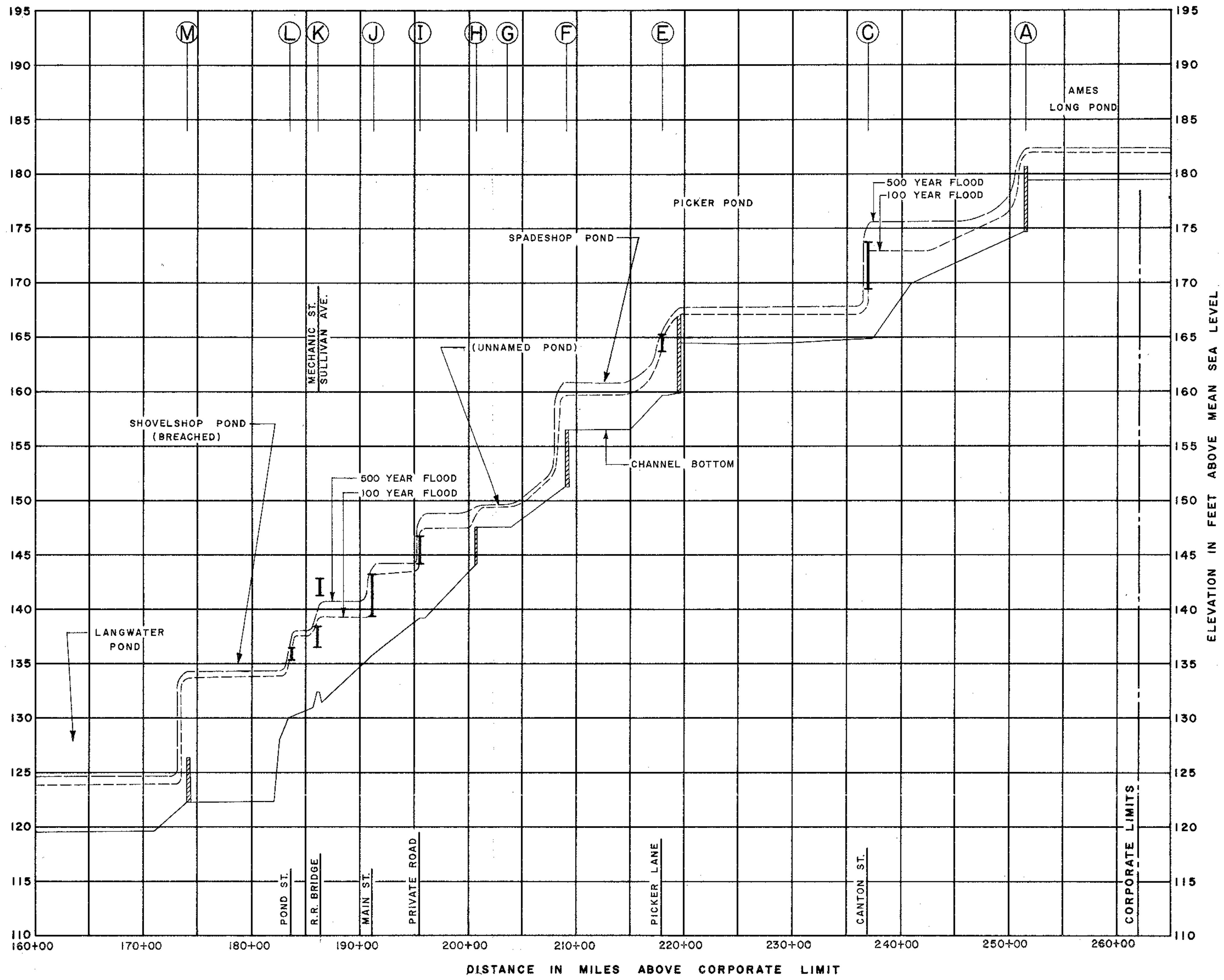
EASTON, MASSACHUSETTS

WHITMAN BROOK

HIGH WATER PROFILES

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



LEGEND

I BRIDGE OR CULVERT

DAM

(A) STREAM CROSS SECTION

NOTES:

1. FOR PLAN, SEE PLATES 6 & 7

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS

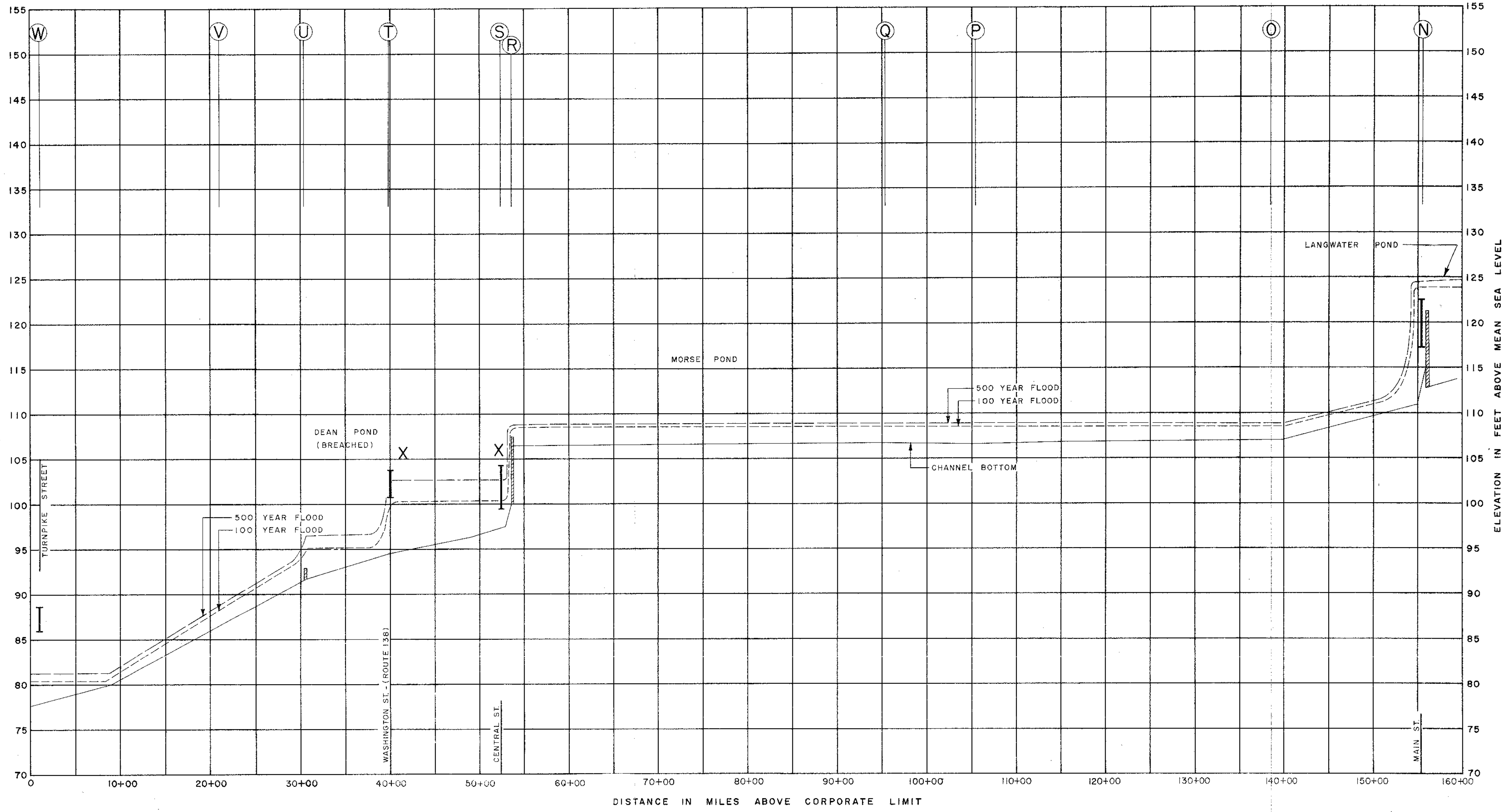
QUESET BROOK

HIGH WATER PROFILES

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

PLATE 18



LEGEND

I BRIDGE OR CULVERT

DAM

Ⓦ STREAM CROSS SECTION

X HIGH WATER (MARCH 1968)

NOTES:

1. FOR PLAN, SEE PLATES 6 & 7
2. ELEVATIONS FOR THE MARCH, 1968 FLOOD WERE OBTAINED FROM INTERVIEWS WITH RESIDENTS.
3. OBSERVED ELEVATIONS ARE HIGHER THAN THE CALCULATED FLOOD BECAUSE OF THE BREACHING OF THE DAM AT FLYAWAY POND RATHER THAN HYDROLOGICAL CALULATIONS.

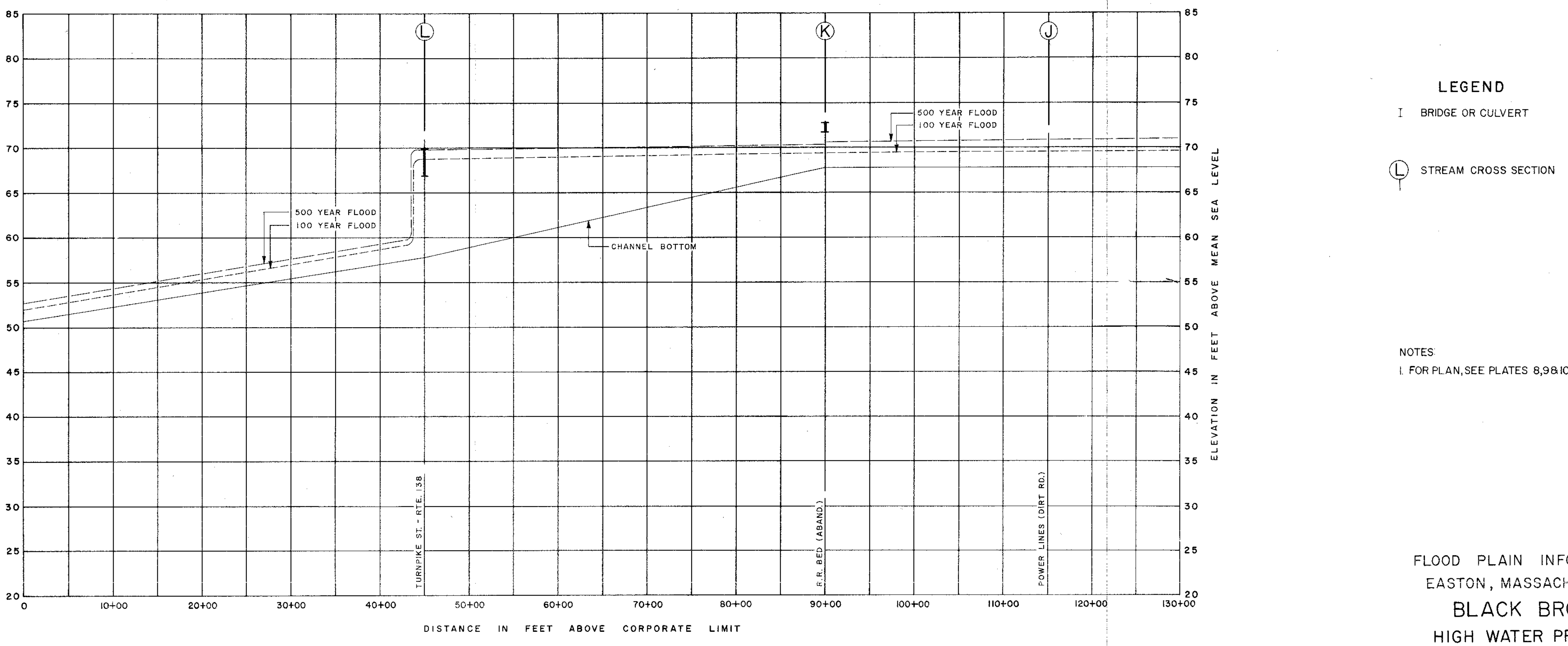
FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS

QUESET BROOK

HIGH WATER PROFILES

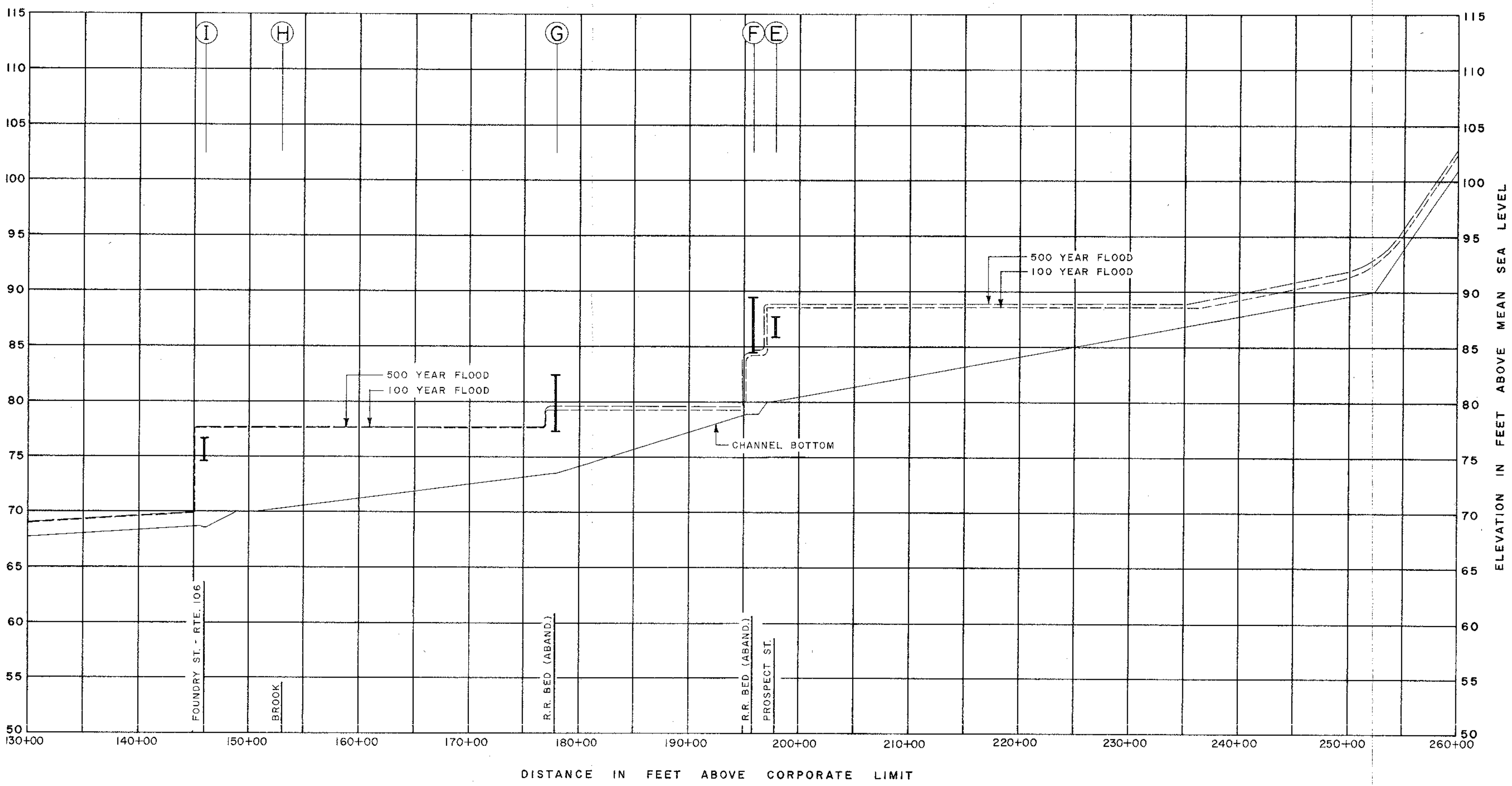
APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



NOTES:
1. FOR PLAN, SEE PLATES 8,9 & 10.

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS
BLACK BROOK
HIGH WATER PROFILES
APRIL 1977
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



LEGEND

I BRIDGE OR CULVERT

(G) STREAM CROSS SECTION

NOTES:

1. FOR PLAN, SEE PLATES 8, 9 & 10.

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS

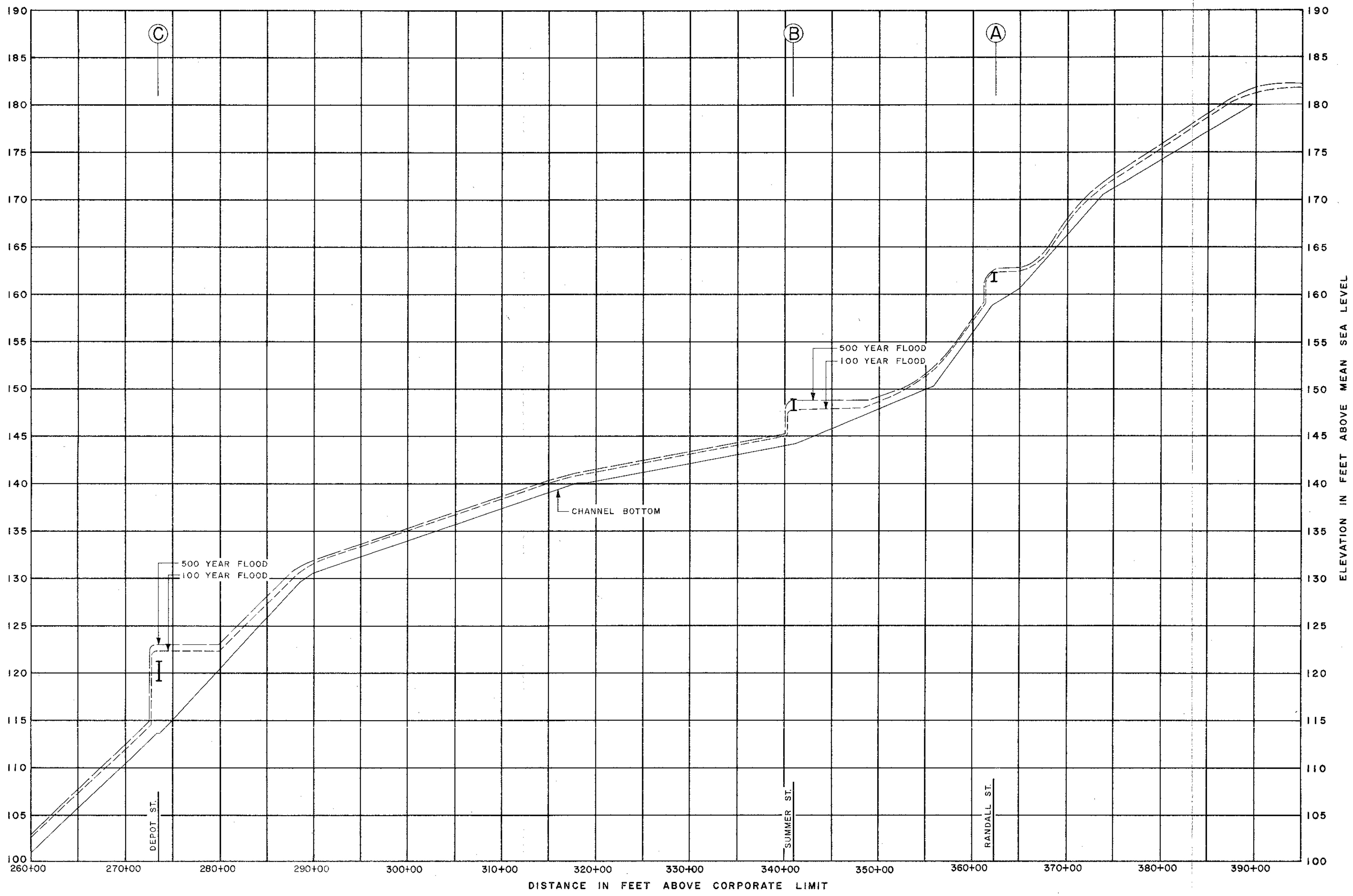
BLACK BROOK

HIGH WATER PROFILES

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

PLATE 21



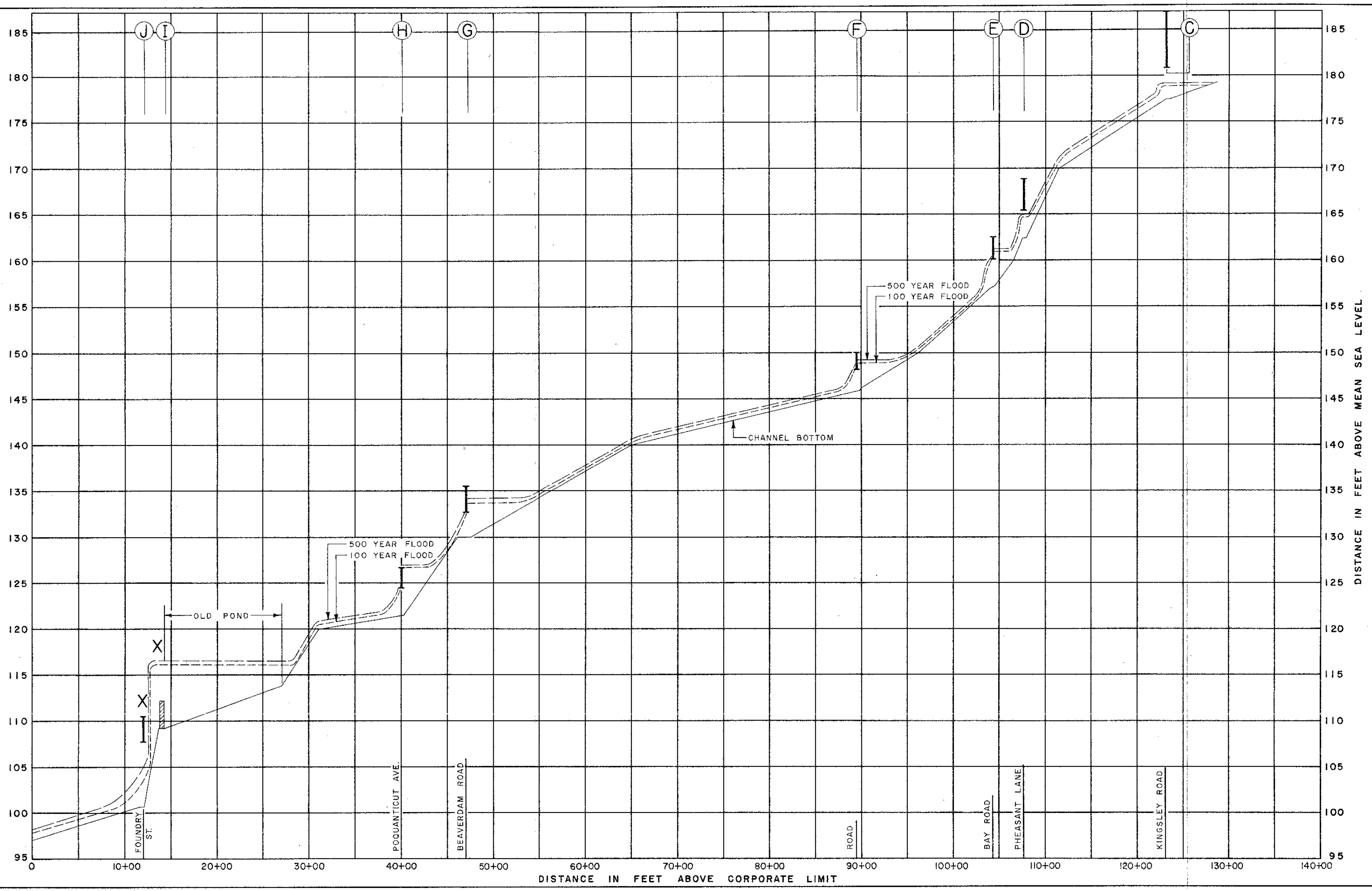
NOTES:
1. FOR PLAN, SEE PLATE 8.

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS

BLACK BROOK
HIGH WATER PROFILES

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



LEGEND

I BRIDGE OR CULVERT

DAM

(F) STREAM CROSS SECTION

X HIGH WATER (MARCH 1968)

NOTES:

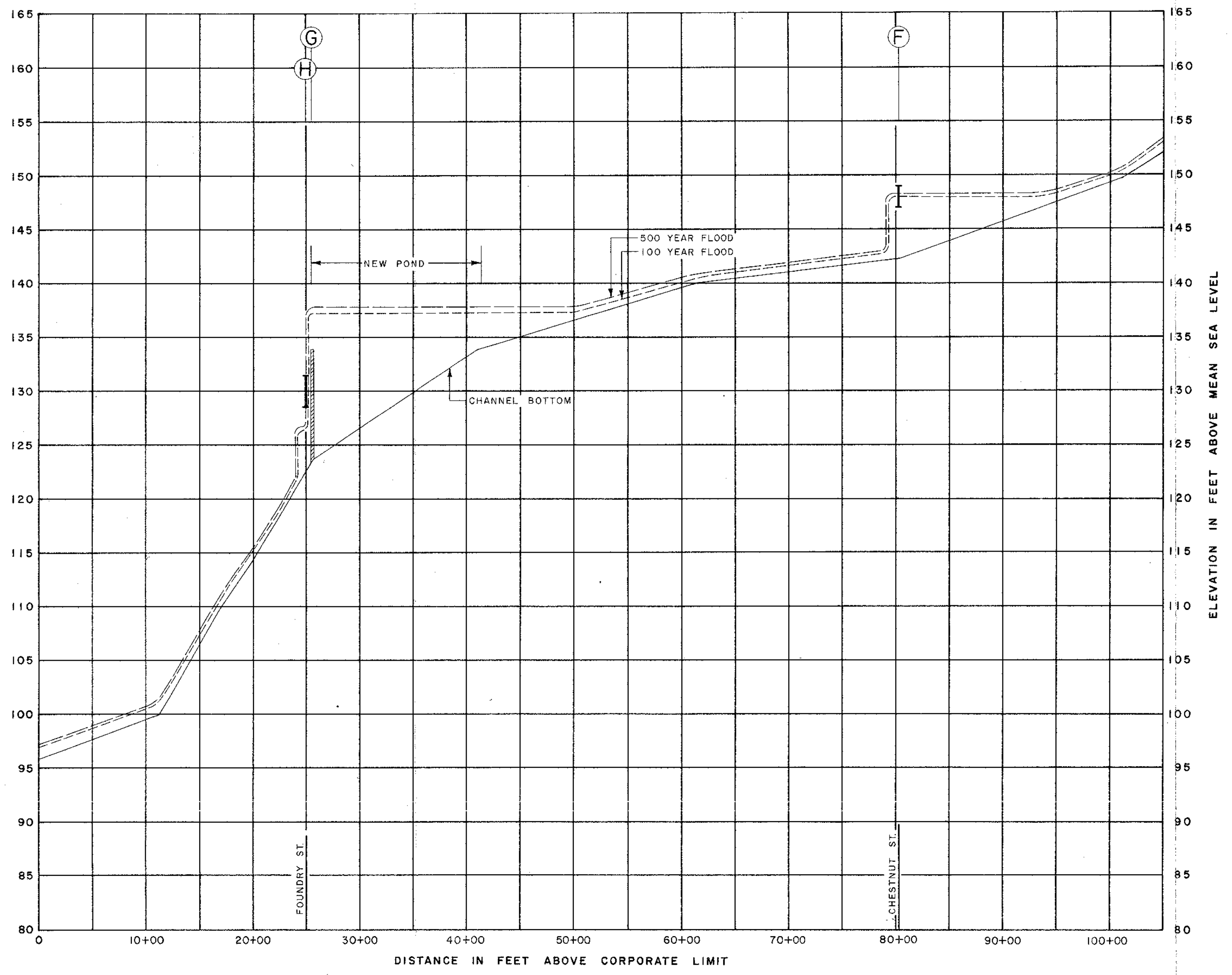
1. FOR PLAN, SEE PLATE II.
2. ELEVATIONS FOR THE MARCH, 1968 FLOOD WERE OBTAINED FROM INTERVIEWS WITH RESIDENTS. OBSERVED ELEVATIONS ARE HIGHER THAN CALCULATED ELEVATIONS FOR 100 YEAR AND 500 YEAR FLOODS BECAUSE FLASH BOARDS AT SPILLWAY OF OLD POND COULD NOT BE REMOVED PRIOR TO STORM.

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS

BEAVER BROOK
HIGH WATER PROFILES

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



LEGEND

- BRIDGE OR CULVERT
- DAM
- STREAM CROSS SECTION

NOTES:
1. FOR PLAN, SEE PLATES 13 & 14

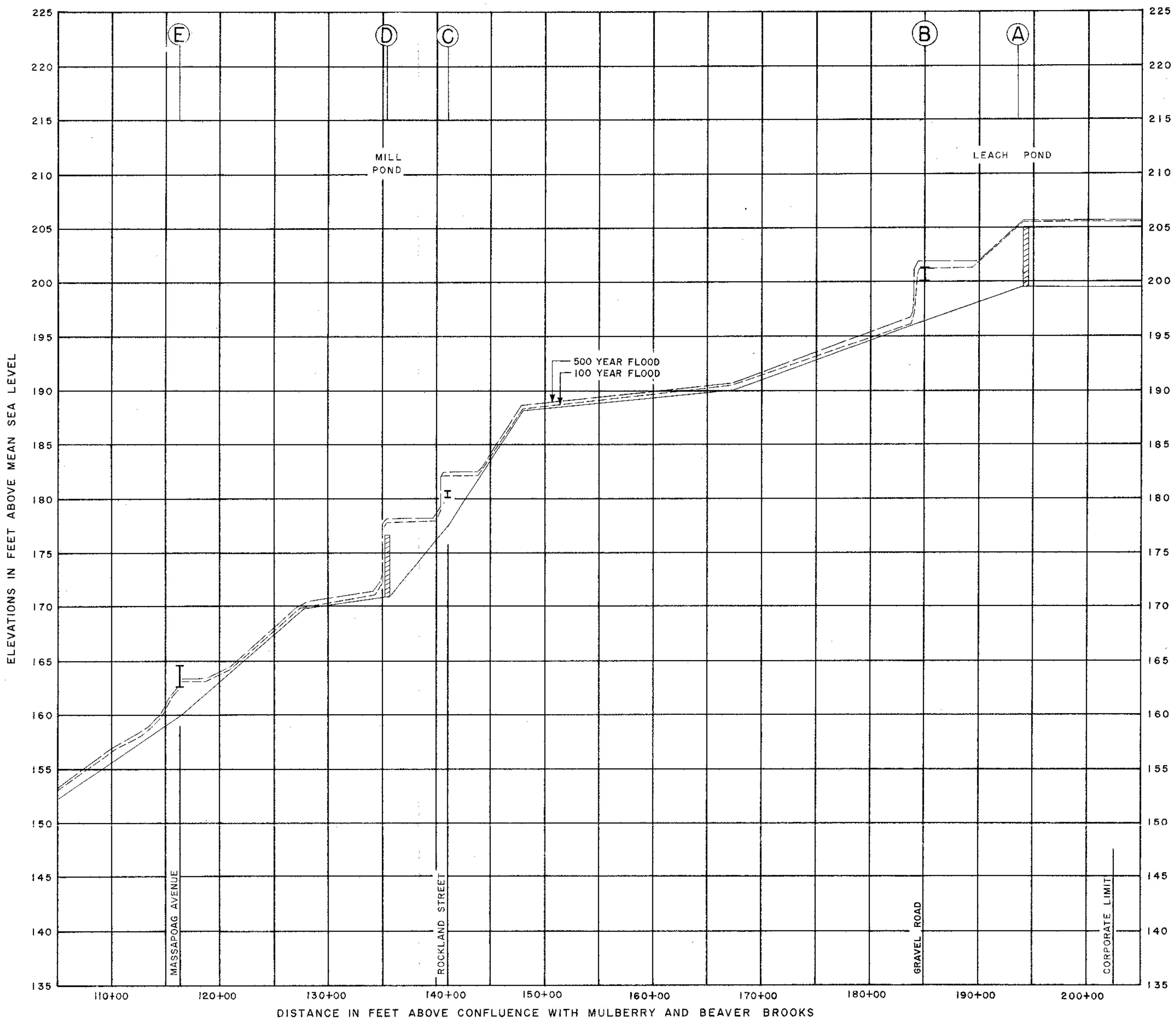
FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS

POQUANTICUT BROOK

HIGH WATER PROFILES

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



LEGEND

BRIDGE OR CULVERT

DAM

STREAM CROSS SECTION

NOTES:

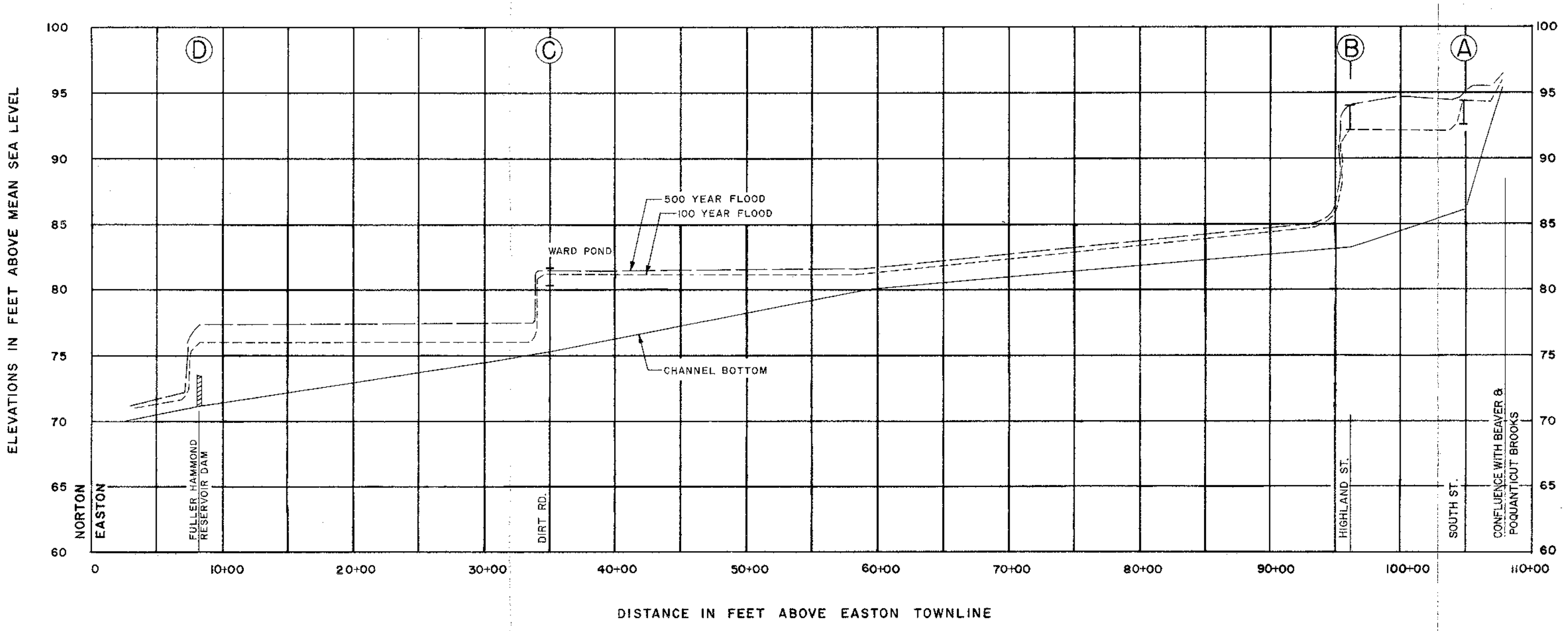
I. FOR PLAN, SEE PLATES 12 & 13

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS

POQUANTICUT BROOK
HIGH WATER PROFILES

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



LEGEND

I BRIDGE OR CULVERT

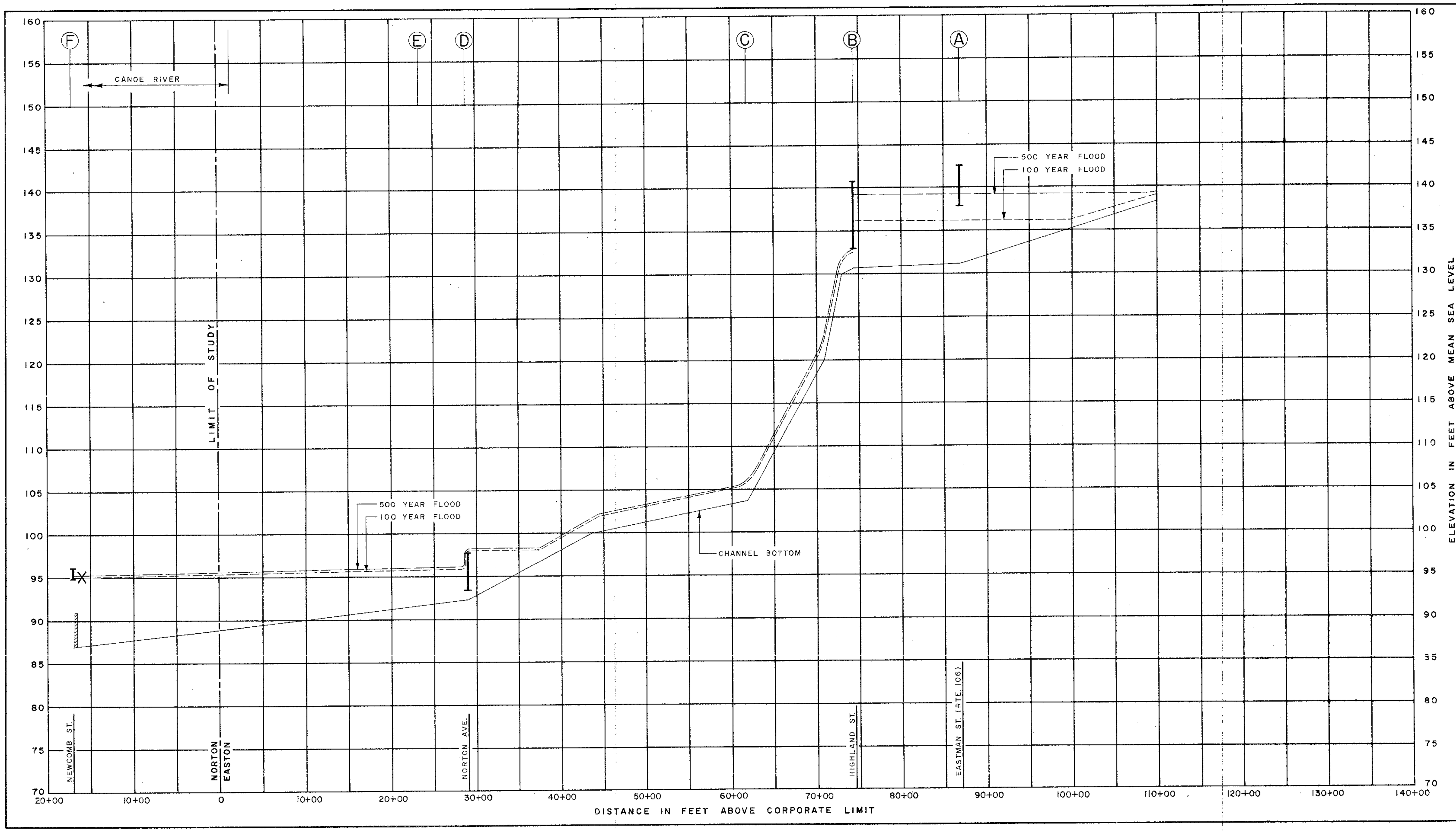
DAM

(A) STREAM CROSS SECTION

NOTES:
1. FOR PLAN, SEE PLATE 14

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS
MULBERRY BROOK
HIGH WATER PROFILES
APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



LEGEND

- I BRIDGE OR CULVERT
- DAM
- (A) STREAM CROSS SECTION
- X HIGH WATER (MARCH 1968)

NOTES:
1. FOR PLAN, SEE PLATE 15
2. ELEVATIONS FOR THE MARCH, 1968 FLOOD WERE OBTAINED FROM INTERVIEWS WITH RESIDENTS.

FLOOD PLAIN INFORMATION
EASTON, MASSACHUSETTS

GOWARDS BROOK
HIGH WATER PROFILES

APRIL 1977

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.